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COMMUNICATIONS & TECHNOLOGY

OCTOBER 2005

CQ

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Complete Details: FCC Code Test Proposal
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: Mike Samarco, W1JZ,
ssachusetts, takes readings
f his tower. Details on page 84.

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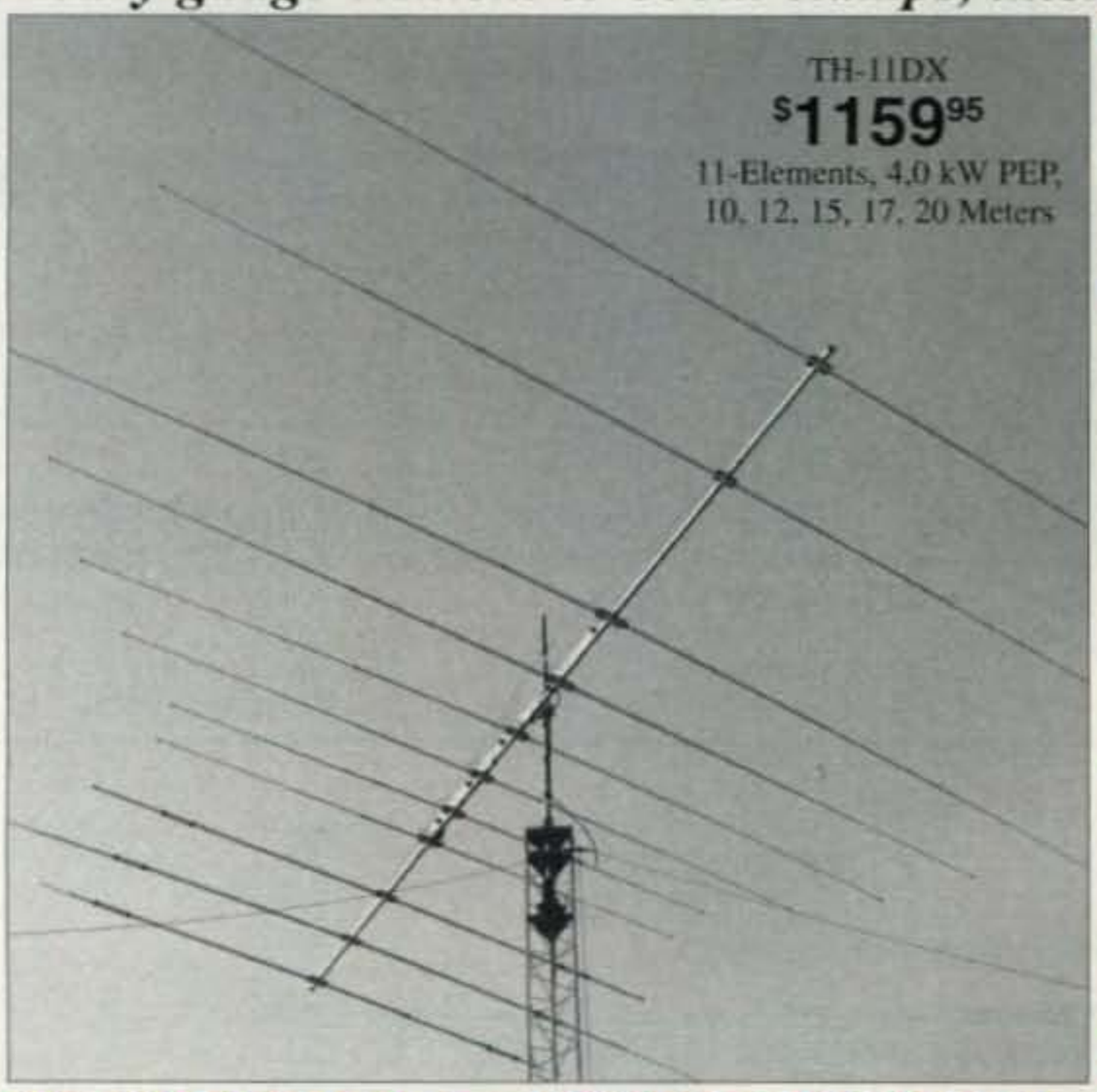

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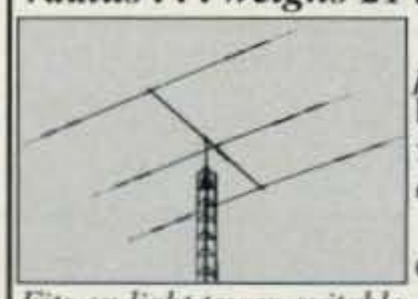

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TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1159.95
TH-7DX	**7**			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$869.95**
TH-5MK2	5	• www.hy-gain.com • Hy-Gain catalog • Call toll-free 800-973-6572		1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$759.95
TH-3MK4	**3**			**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$469.95**
TH-3JRS	3			600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$359.95
TH-2MK3	**2**			**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$369.95**
EXP-14	4			1500	10,15,20	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$599.95

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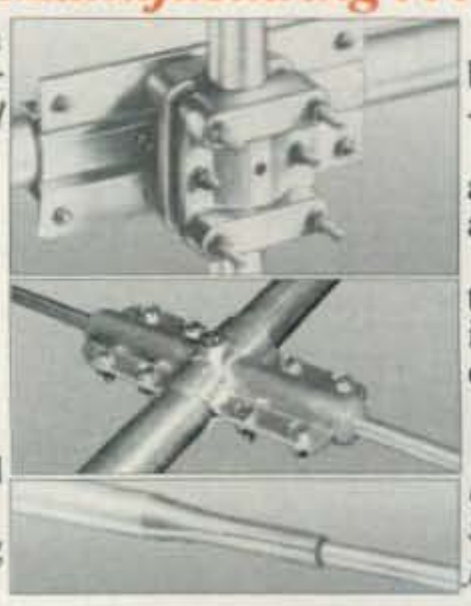
2. ***Tooled*** *Boom-to-Element Clamp*

3. **Thick-wall** *swaged* aluminum tubing



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Die-cast aluminum boom-to-mast bracket and element-to-boom compression clamps are made with specially *tooled* machinery.

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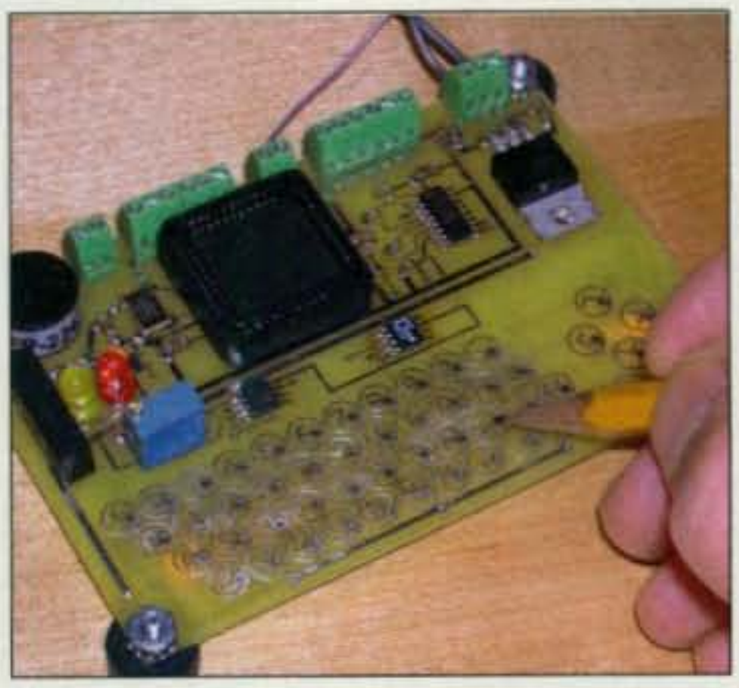

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NCVEC Backs Out of Rulemaking Arena

The National Council of Volunteer Examiner Coordinators (NCVEC), which has been very active in recent years in FCC rulemaking proceedings relating to amateur licensing, has decided to step back and concentrate on the business of creating and administering license exams. The NCVEC was one of 18 groups or individuals that had filed petitions with the FCC after the international requirement for passing a code exam for HF access was dropped in 2003, and was one of two groups (the ARRL was the other) proposing the creation of a new entry-level license class. But when the FCC announced its proposal to eliminate code exams at the NCVEC's annual meeting in July, the council decided not to file formal comments and instead voted to disband its Rules Committee, which had drafted its FCC filings. According to the *ARRL Letter*, ARRL-VEC Assistant Manager Perry Green, WY1O, said there was disappointment among the dozen VECs represented at the conference that the FCC had not backed either a new entry-level license or an NCVEC proposal to upgrade all Technicians to General and all Advanced Class licenses to Extra without additional testing. Fred Maia, W5YI, who had been Chairman of the Rules Committee, encouraged individual VECs to file their own comments on the FCC's rulemaking proposal.

Italy, Canada, Drop Code Test Requirements

Italy and Canada have become the latest countries to drop the requirement that amateurs pass a Morse code exam as a condition of operating on the HF (shortwave) bands. A statement on the website of Italy's national ham association (ARI) indicated that the Communications Ministry had merged the country's Class A and B licenses and eliminated the code test requirement for earning any ham license.

The ruling in Canada was a little more complicated, granting HF privileges to all hams with both Basic and Advanced qualifications, plus all those who received a Basic qualification before April 2, 2002, and those who received their Basic qualification after April 2, 2002, provided they had scored at least 80% on their license exam. According to the *ARRL Letter*, Canadian hams who scored less than 80% on their Basic exam will be able to earn HF privileges by either passing the Morse exam (which will still be offered), passing the Advanced written exam, or retaking the Basic test and getting a grade of at least 80%. (*And you thought the* FCC's *rules were complicated!*)

VoIP "Vital" Addition to Hurricane Reporting

Voice over Internet Protocol (VoIP) ham networks such as EchoLink and IRLP have become important additions to overall amateur radio support of forecasters tracking hurricanes at the National Hurricane Center. Julio Ripoll, WD4R, Assistant Coordinator of NHC amateur station WX4NHC, told the *ARRL Letter* that the joint EchoLink/IRLP VoIP-WX Net has for the first time allowed many Technician Class hams to report conditions on the ground to the hurricane center. In addition, he said, VoIP networks have helped link Red Cross headquarters, state emergency operations centers, and National Weather Services offices throughout affected areas. He also noted that during Hurricane Emily the VoIP-WX Net generated "some of the most important surface reports" from Grenada, including one of a roof being blown off a hospital, and says these reports were "especially vital during the very late evening hours, when there was a lack of HF propagation into the affected area."

Hams Coordinate Rescue at Sea

Hams from the U.S., Mexico and Canada joined forces last July to bring help to two injured sailors on a disabled sailboat in the Pacific Ocean. On July 24th three hams were enjoying a Sunday morning QSO on 20 meters when they were interrupted by a "mayday" call from the sailboat *Enamorado*. According to reports from the *ARRL Letter* and *Newsline*, Ed Toal, N9MW, and Ralph Henes, W9CAR, both in Wisconsin, responded to the call and began gathering information while Dick Mannheimer, K6LAE, in Los Angeles (who couldn't hear the boat) contacted the Coast Guard and relayed the report. After determining that the boat was in Mexican waters, the Coast Guard contacted the Mexican Navy, and the hams kept up the conversation, with additional amateurs in different parts of the U.S. and Canada helping relay transmissions and keeping the frequency clear.

Some three hours later, the Coast Guard had had no response from Mexico, so Henes called the Mexican Navy himself and got a rescue vessel to come up on the frequency. Unfortunately, neither sailor spoke enough Spanish to communicate effectively, but then Jorge Lira, XE1JP, came on the air and volunteered to translate. Once everyone was communicating, a helicopter quickly arrived and rescued the sailors (one of whom was a ham, KC6ORF), and the Mexican Navy towed the boat to port for repairs.

K1MAN License Renewal Set Aside

In a follow-up to last month's "Washington Readout" column on the $21,000 fine levied by the FCC against controversial amateur Glenn Baxter, K1MAN, the FCC in late July informed Baxter that it had set aside his license renewal "for enforcement review." Baxter responded that the FCC's action violated his constitutional right to due process and that he would continue to operate K1MAN "indefinitely" until the FCC makes its final decision and he exhausts all court appeals.

BPL System at ARRL HQ

A Motorola Broadband over Power Lines system has been installed *at* ARRL Headquarters in Newington, Connecticut, where it appears to be operating without causing interference.

According to the ARRL, the Motorola Powerline LV system was installed at League station W1AW in late August and preliminary tests showed the system to be "amateur-radio friendly." ARRL Laboratory Manager Ed Hare, W1RFI, said, "We found only a few dB of BPL noise on one ham band using the highest gain antenna at W1AW aimed right at the W1AW building." He added that on all other bands and antennas the BPL noise did not change S-meter readings.

The Motorola system is different from those used by other BPL providers, and Motorola has worked closely with the ARRL in trying to create a system that does not result in interference to HF spectrum users.

"The ARRL is not opposed to BPL," noted the League's Media Relations Manager, Allen Pitts, W1AGP. "What we do oppose is interference. This shows that it is possible to have BPL without interference."

For breaking news stories, plus info on additional items of interest, sign up for CQ's free online newsletter service. Just click on "CQ Newsletter" on the home page of our website at <http://www.cq-amateur-radio.com>.

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HAM-IV

HAM-IV
$559.95

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HAM IV and HAM V Rotator Specifications	
Windl.oad capacity (inside tower)	15 square feet
Wind Load (w/mast adapter)	**7.5 square feet**
Turning Power (in lbs.)	800
Brake Power (in lbs.)	**5000**
Brake Construction	Electric Wedge
Bearing Assembly	**dual race/96 ball bearings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight (lbs.)	26
Effective Moment (in tower)	**2800 ft/lbs.**

TAILTWISTER SERIES II

T-2X
$649.95

T-2XD
$1029.95
with DCU-1

For large medium antenna arrays up to 20 sq. ft. wind load. Available with *DCU-1 Pathfinder* digital control (T2XD) or standard analog control box (T2X) with *new* 5-second brake delay and *new* Test/ Calibrate function. Low temperature grease, alloy ring gear, indicator potentiometer, ferrite beads on potentiometer wires, *new* weatherproof AMP connectors plus 8-pin plug at control box, triple bearing race with 138 ball bearings for large load bearing strength, electric locking steel wedge brake, North or South center of rotation scale on meter, low voltage control, 2 1/16 inch max. mast.

TAILTWISTER Rotator Specifications	
Wind load capacity (inside tower)	20 square feet
Wind Load (w/ mast adapter)	**10 square feet**
Turning Power (in lbs.)	1000
Brake Power (in lbs.)	**9000**
Brake Construction	Electric Wedge
Bearing Assembly	**Triple race/138 ball brngs**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight (lbs.)	31
Effective Moment (in tower)	**3400 ft/lbs.**

CD-45II

CD-45II
$389.95

For antenna arrays up to 8.5 sq. feet mounted inside tower or 5 sq. ft. with mast adapter. Low temperature grease good to -30 F degrees. *New* Test/Calibrate function. Bell rotator design gives total weather protection, dual 58 ball bearing race gives proven support. Die-cast ring gear, stamped steel gear drive, heavy duty, trouble free gear train, North center scale, lighted directional indicator, 8-pin plug/socket on control unit, snap-action control switches, low voltage control, safe operation, takes maximum mast size to 2 1/16 inches. MSLD light duty lower mast support included.

CD-45II Rotator Specifications	
Wind load capacity (inside tower)	8.5 square feet
Wind Load (w/ mast adapter)	**5.0 square feet**
Turning Power (in lbs.)	600
Brake Power (in lbs.)	**800**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/48 ball brings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight (lbs.)	22
Effective Moment (in tower)	**1200 ft/lbs.**

HAM-V

HAM-V
$949.95
with DCU-1

For medium antenna arrays up to 15 square feet wind load area. Similar to the HAM IV, but includes *DCU-1 Pathfinder* digital control unit with gas plasma display. Provides automatic operation of brake and rotor, compatible with many logging/contest programs, 6 presets for beam headings, 1 degree accuracy, auto 8-second brake delay, 360 degree choice for center location, *more!*

ROTATOR OPTIONS

MSHD, $99.95. Heavy duty mast support for T2X, HAM-IV and HAM-V.
MSLD, $39.95. Light duty mast support for CD-45II and AR-40.
TSP-1, $34.95. Lower spacer plate for HAM-IV and HAM-V.

AR-40

AR-40
$289.95

For compact antenna arrays and large FM/TV up to 3.0 square feet wind load area. Dual 12 ball bearing race. Automatic position sensor never needs resetting. Fully automatic control -- just dial and touch for any desired location. Solid state, low voltage control, safe and silent operation. 2 1/16 inch maximum mast size. MSLD light duty lower mast support included.

AR-40 Rotator Specifications	
Wind load capacity (inside tower)	3.0 square feet
Wind Load (w/ mast adapter)	**1.5 square feet**
Turning Power (in lbs.)	350
Brake Power (in lbs.)	**450**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/12 ball bearings**
Mounting Hardware	Clamp plate/steel bolts
Control Cable Conductors	**5**
Shipping Weight (lbs.)	14
Effective Moment (in tower)	**300 ft/lbs.**

HDR-300A

HDR-300A
$1379.95

For ***king-sized*** antenna arrays up to 25 sq.ft. wind load area. Control cable connector, *new* hardened stainless steel output shaft, *new* North or South centered calibration, *new* ferrite beads on potentiometer wires reduce RF susceptibility, *new* longer output shaft keyway adds reliability. Heavy-duty self-centering steel clamp and hardware. Display accurate to 1°. Machined steel output.

HDR-300A Rotator Specifications	
Wind load capacity (inside tower)	25 square feet
Wind Load (w/ mast adapter)	**not applicable**
Turning Power (in lbs.)	5000
Brake Power (in lbs.)	**7500**
Brake Construction	solenoid operated locking
Bearing Assembly	**bronze sleeve w/rollers**
Mounting Hardware	stainless steel bolts
Control Cable Conductors	**7**
Shipping Weight (lbs.)	61
Effective Moment (in tower)	**5000 ft/lbs.**

Digital Automatic Controller

DCU-1
$649.95

Automatically controls T2X, HAM-IV, V rotators. 6 presets for favorite headings, 1 degree accuracy, 8-sec. brake delay, choice for center of rotation, crisp *plasma* display. Computer controlled with many logging/contest programs.

AR-35 Rotator/Controller

AR-35
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For UHF, VHF, 6-Meter, TV/FM antennas. Includes automatic controller, rotator, mounting clamps, mounting hardware. 110 VAC. One Year Warranty.

RBD-5
$29.95

NEW! Automatic Rotator Brake Delay

Provides automatic 5-second brake delay -- insures your rotator is fully stopped before brake is engaged. Prevents accidentally engaging brake while rotator is moving. Use with HAM II, III, IV, V, T2Xs. Easy-to-install. Includes pre-assembled PCB, hardware.

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Tougher than Tough!

YAESU's rugged new VX-120/170 Series of 2-meter Hand-helds aren't just built tough. They're submersible, have a huge, easy-to-read LCD, and they provide big, bold audio (almost 3/4 of a Watt) from the huge internal speaker!

The VX-120/VX-170 are compact, high-performance FM hand-helds providing up to five Watts of RF power, along with big audio output (700 mW) and unmatched protection against the elements!

Protected against water ingress to IPX7 specifications (submersion for up to 30 minutes at a depth of 3 feet), the VX-120/170 feature long operating times, thanks to the supplied 1400 mAh NiMH Battery Pack. The 8-key VX-120 provides the utmost in operation simplicity, while the 16-key VX-170 includes direct keyboard frequency entry and direct DTMF input. And both models provide quick, one-touch access to YAESU's exciting and fun WiRES-II™ VoIP Internet Linking system!

- Ultra-rugged 5 W 2 m Hand-helds
- Expanded RX Coverage: 137-174 MHz
- Long-life 1400 mAh NiMH Battery Pack supplied
- Enhanced Paging and Code Squelch
- User Password protects against unauthorized use
- Dedicated Weather Band Channels with Severe Weather Alert Scan
- 200 Memories with Labeling and 10 Memory Groups
- Smart Search™ Automatic Memory Loading

IPX7 Submersible 30 minutes @ 3 feet (1 m) | Huge LCD | Big 700 mW Audio! | 1400 mAh Long Life Battery

5 W Submersible Full Featured 2 m Hand-Helds

VX-120/VX-170

(8 key Version / 16 key Version)

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WIRES-II

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Yaesu's experienced engineering team has made the computer interface box HRI-100 easy to set up and easy to operate, thanks to user-friendly software. The configuration requirement for WiRES-II is only a personal computer with sound card, HRI-100, mobile radio, and an Internet line; we recommend a DSL or ISDN line. WiRES-II updates for more features are occasionally provided by Yaesu, and are free of charge to download from the Yaesu Web site.

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- •HRI-100 interface with AP CD-ROM software, data cable, audio cables.
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- •Microsoft Windows 98SE or later operating system.
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zero bias – a CQ editorial

BY RICH MOSESON,* W2VU

A Wrong Turn at the FCC

The FCC says it's time to do away with the code test as part of the amateur licensing requirements. But it's not willing—at least at the moment—to consider proposals for a new, HF-focused, entry-level license. We feel the FCC is looking for the easy way out, trying to fix a problem that isn't a problem, and is missing an opportunity to really breathe new life into the amateur licensing structure. (For details on the FCC's proposal, WT Docket 05-235, see this month's "Washington Readout" column on page 13).

On the Matter of Code Tests

First of all, here's where we stand on the matter of CW and code tests. We are very strong believers in the value, efficiency, and, for those among us who love it, the pure joy of operating CW. But … **passing a code test does not make you a better ham or a good CW operator, or any more likely than anyone else to actually operate CW**. CW will always attract a certain number of hams who find it will be valuable or enjoyable in their amateur radio pursuits and who will learn and use it whether or not it's a license requirement.

We strongly believe in the value of CW as an operating mode and its ability to draw new adherents (particularly if current CW ops make a point of sharing their enthusiasm and their success stories with their fellow hams), and we strongly disagree with those "of little faith" who feel that CW operation will wither and die if it's not a license requirement. **CW can and will hold its own as an operating mode whether or not it's a license requirement.**

The FCC's Proposal

On July 19, the FCC released a 30-page Notice of Proposed Rule Making (WT Docket 05-235), in response to the 18 petitions that had been filed since 2003, when the International Telecommunications Union decided to leave the question of code testing up to each country to decide on its own.

We were surprised that the Commission proposed eliminating the code test altogether, since preliminary comments filed on the 18 petitions suggested a strong consensus could be built behind eliminating the code test for General but keeping it for Extra. In fact, the Commission relied on these comments to support its proposal to drop the General Class code test, but since it didn't have as much support for eliminating the code exam for Extra, it simply declared that "maintaining a telegraphy requirement for the Amateur Extra Class license would not be in the public interest."

It's not like the FCC to pass up an opportunity for consensus on such a contentious issue … unless the real feeling among the folks in Washington is that they don't want to deal with this issue again five or ten years down the road. If so, let's not play games with citing popular support for part of a proposal, then ignoring it for the rest. If the Commission feels that a code test no longer serves the public interest—and it's been of that opinion at least since the 2000 restructuring decision, when it reduced the speed on code exams to the lowest level that it felt would satisfy international requirements at the time—then be honest and apply that same logic to both General and Extra.

Besides, the code test does not appear to be an impediment to upgrading to Extra. In April of 2000, when restructuring took effect and the speed for the Extra Class code test was lowered from 20 wpm to 5 wpm, there were just over 77,500 Extra Class hams, according to the records kept by AHØA. As of July 31, 2005, the most recent numbers available at press time, there were just under 107,000 Extras. A gain of nearly 30,000 in a little over five years doesn't sound like a problem needing to be fixed. As the saying goes, "if it ain't broke; don't fix it."

Frankly, the code hasn't been that much of an obstacle to becoming a General, either, with a net increase of about 25,000 in the same time period. But again, the preliminary comments filed in response to the various petitions showed a broad consensus in favor of eliminating the code test for General while keeping it for Extra. We feel that this course of action better represents the will of the amateur community than the FCC's proposal to eliminate the code test altogether.

Entry-Level Opportunity

We also feel the FCC is making a big mistake in refusing to consider a new entry-level license that permits new hams to have a reasonable amount of access to the HF ham bands. HF is where the "sizzle" is in ham radio, and for more than 30 years, offering a taste of that sizzle was a powerful draw for new hams and a powerful motivator to upgrade. From the 1950s through the 1980s, the traditional "port of entry" into amateur radio was the HF-focused Novice Class license, even though the Technician Class license was available as well. The elimination of the code test for Technician in the early 1990s, coupled with the popularity at that time of 2-meter repeaters, turned the Technician into the *de facto* entry-level license, despite the success only a few years earlier of Novice Enhancement. The popularity of the Novice slipped throughout the 1990s to the point where the FCC stopped issuing new Novice licenses in 2000. There are two big problems with this current entry path:

1) Far too many Techs never get to experience the unique opportunities presented by the HF bands for DXing and a variety of other amateur radio activities, and some never get on the air at all. If you don't know what you're missing, there's not all that much motivation to upgrade. In addition, we've developed into a two-class culture of "Techs" and "everybody else."

2) The old Novice license exam was easy enough that a typical young teenager could pass it and gain immediate access to the world of HF ham radio. For those of us who feel it is important to make ham radio accessible to young people, the current entry route does not work. The Technician exam, with its 700+ question pool, followed by the General exam

(Continued on page 107)

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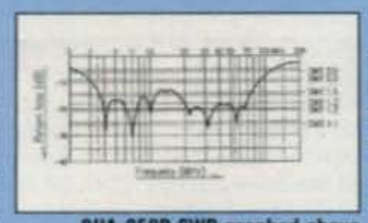

CHA-250B SWR graphed above

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• Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

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announcements

The following Special Event stations are scheduled for the month of October:

K2TD, from the 50th anniversary of the Burlington County (New Jersey) Radio Club; 0000Z Oct. 7 to 2359Z Oct. 24 in the general portion of the HF and VHF bands (80–2 Meters). Send QSL and SASE for QSL to K2TD, P.O. Box 65, Fort Dix, NJ 08640 (www.k2td.bcrc.org).

N4J, from Thomas Jefferson Poplar Forest Home Special Event, Bedford, VA; Lynchburg ARC; 1300Z Oct. 1 to 2000Z Oct. 16 on 7.260, 14.260, 21.360, 28.460 MHz. For QSL send QSL and SASE to Ed Narwid, W4OAF, 1799 Otter Hill Rd., Bedford, VA 24523.

W4I, from St. George Island, Florida, IOTA NA-085; Tennessee Valley DX Association; 1900Z Oct. 2 to Sunday morning Oct. 9 on 10–80 meters SSB, CW, plus some PSK and RTTY, and 6 meters SSB and CW. QSL via WA4AA direct with SASE or via the bureau. For more information, go to <www.tvdxa.com>; inquiries: <wa4aa@ arrl.net>.

W8S, from an S-bridge, New Concord, OH; 10 AM to 4 PM EDST, Oct. 15 on 7.235–.245 and 14.260 MHz. For QSL send QSL and SASE to Cambridge ARA, W8VP, P.O. Box 1804, Cambridge, OH 43725.

NØCWP, from 17th annual Pumpkinfest and Weigh-Off, Anamosa, IA; Jones County ARC; 1300–1700Z Oct. 1 on 14.260 ±QRM. For certificate send SASE to Jim McClintock, 310 Vine St., Morley, IA 52312 (www.anamosachamber.com).

The following hamfests, etc., are slated for October:

Oct. 1, **Rock Hill Hamfest & Computer Expo,** Rock Hill America Legion Post 34, Rock Hill, South Carolina. Contact Bob Bacharach, WA2EMF, 803-327-2634, e-mail: <wa2emf@arrl.net>; on the web: <www.rockhillhamfest.com>. (Talk-in 147.03 [–600])

Oct. 1, **Red Rose Repeater Assn. Tailgate Fest,** West Earl Community Park, Lancaster County, Pennsylvania. Contact Dave, W3CWE, 717-872-6578, e-mail: <w3cwe@comcast.net>; <www.qsl.net/RRRA>. (Talk-in 147.015+ PL 118.8)

Oct. 1, **Ham Expo,** Bell County Expo Center, Belton, Texas. Contact Mike LeFan, WA5EQQ, 254-773-3590, e-mail: <expo@tarc.org>. (Talk-in 146.820– [123.0])

Oct. 2, **HOSARC Hamfest,** New York Hall of Science parking lot, Flushing Meadow Corona Park, Queens, New York. Contact Steve Greenbaum, WB2KDG, 718-898-5599, e-mail: <wb2kdg@arrl.net>; <www.HOSARC.org>. (Talk-in 444.200 PL 136.5 or 146.52 simplex)

Oct. 8, **Chanute Area ARC Hamfest,** Zion Lutheran Activity Center, Chanute, Kansas. Contact Gary Sherard, WA5FLV, 620-431-1667. (Talk-in 146.745, PL 100)

Oct. 8, **Bergen (NJ) ARA Fall Hamfest,** Westwood Regional JR/SR High School, Washington Township, New Jersey. Contact Jim Joyce, K2ZO, 201-664-6725, e-mail: <k2zo@arrl.net>. (Talk-in 146.19/79 PL 141.3; exams 8–10 AM)

Oct. 8, **Hamfest Paris, TX,** Red River Valley Fairgrounds, Paris, Texas. Contact Richard Lenoir, KB5SCK, 903-783-0968; <www.dfwtrafficnet.com>. (Talk-in 146.52, 147.35 PL 110.9+)

Oct. 9, **Nutmeg Hamfest & ARRL State Convention,** Mountainside Resort, Wallingford, Connecticut. For information go to: <www.nutmeghamfest.com>; e-mail: <info@nutmeghamfest.com>. (Talk-in 147.36+; exams contact Joel, N1JEO, 203-631-1161, e-mail: <vetest @nutmeghamfest.com>)

Oct. 15, **Al Brock Memorial Hamfest/Computer Show,** Rome Civic Center, Rome, Georgia. Contact Grover Keith, KA5QFI, 706-766-1118 or 706-292-0516, e-mail: <gfkeith@bellsouth.net>; <http://www.w4vo.org>. (Talk-in 146.34/146.94, PL 88.5; exams)

Oct. 16, **RF Hill ARC Hamfest,** Sellersville Firehouse, Sellersville, Pennsylvania. Contact Charles Schmell, KB3CEZ, 215-538-7458 home, 215-257-6368 work (8 AM to 4:30 PM), e-mail: <kb3cez@arrl.net>; <www.rfhill.ampr.org>. (Talk-in 145.31–, PL 131.8; exams 10 AM to noon)

Oct. 22, **Great Lakeshore Super Swap,** Harbor Lights School, Holland, Michigan. For info go to <http://superswap.hollandarc.org/2005/>, e-mail: <Nana_sue48@hotmail.com>, or call 616-394-9821. (Talk-in 147.06; exams)

Oct. 22, **Clarksville (TN) Hamfest, Jaycees Building, Clarksville Fairgrounds, Clarksville, Tennessee.** Contact Jimmie Shelton, KT4FQ, e-mail: <kt4fq@charter.net>, or Dan Baker, N4GXE, e-mail: <n4gxe@bellsouth.net>. (Talk-in 147.390+)

Oct. 29, **Beachfest 2005 & ARRL SC State Convention,** Conway National Guard Armory, Conway, South Carolina. Contact Jim Wood, KF4CJE, e-mail: <kf4cje@w4gs.org>, phone 843-236-2772; <http://www.w4gs.org/beachfest>. (Talk-in 145.110; exams 10 AM)

Oct. 30, **Massillon ARC Hamfest & Auction,** Massillon Boys & Girls Club Complex, Massillon, Ohio. Contact Terry Russ, N8ATZ, 3420 Briardale Cr. NW, Massillon, OH 44646; <www.marcradio.org>. (Talk-in 147.18+; exams, contact Gary Kline, WC8W, 330-837-2927)

Oct. 30, **Mason-Dixon Hamfest,** Carroll County Ag Center, Westminster, Maryland. Contact Bill Neeriemer, e-mail: <bneeriemer@verizon.net>; <http://www.qsl.net/~k3pzn>.

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FCC Proposes Dropping All Morse Code Testing

BY FREDERICK O. MAIA,* W5YI

In a surprise move, the FCC has proposed removing the Morse code examination requirement from all amateur radio license classes. However, it could be up to a year before this actually happens, since the proceeding still must go through another round of public comments.

On July 19th the Commission released WT Docket No. 05-235 which addresses 18 Petitions for Rulemaking that were filed by the amateur community between summer 2003 and spring 2004. The release came just three days before the annual Volunteer Examiner Coordinator (VEC) Conference in Gettysburg, Pennsylvania. The FCC's Bill Cross, W3TN, the principal author of the Notice of Proposed Rulemaking, discussed the proposals with the VECs in attendance. The Volunteer Examiner Coordinators are responsible for developing and administering the amateur radio license testing program. The petitions primarily seek to implement new rules that were authorized at the 2003 World Radiocommunication Conference (WRC-03).

Most of the petitioners wanted the FCC to entirely or partially eliminate the international Morse code requirement. However, there were some who asked that the current 5 words-per-minute requirement be maintained, or even that the speed be increased.

In addition, the American Radio Relay League (ARRL) and the National Conference of Volunteer Examiner Coordinators (NCVEC) each requested that a new entry-level class of amateur operator license be established (the two requests were similar but not identical). Still other petitioners asked for changes in the current license structure and associated operating privileges. The proceeding proved to be very controversial, with over 6200 preliminary comments being filed.

Based on the early comments, the FCC proposed to eliminate the requirement that individuals pass a telegraphy examination in order to qualify for any amateur radio operator license. However, the Commission declined to propose any other changes to the current Amateur Radio Service licensing or operating rules.

Morse Code

Prior to 2003, the international Radio Regulations required amateur operators to demonstrate proficiency in correctly sending (by hand) and receiving (by ear) Morse code signals or order to be licensed to operate in the amateur high frequency (HF) bands below 30 MHz.

At the International Telecommunication Union's (ITU's) 2003 World Radiocommunication Conference (WRC-03), held June 9 to July 4, 2003 in Geneva, Switzerland, the nations of the world agreed that Article 25 of the Radio Regulations should be amended to allow a country to determine for itself whether the Morse code requirement should be continued. The effect of this revision was to eliminate the international requirement that a person seeking an amateur radio operator license pass a code test. Dozens of countries immediately responded by dropping their Morse code examinations.

The FCC said that the majority of the petitioners asked that all telegraphy proficiency testing requirements be eliminated. Arguments for abolishing Morse testing included:

(a) the requirement is out of date in the 21st century;

(b) use of Morse code has become obsolete due to satellite and digital communications;

(c) Morse code testing is an unnecessary burden on applicants, because most applicants never use code on the airwaves;

(d) and a burden on the VEs and VECs because these examinations require extensive preparation and special equipment.

(e) the examination process does not require a practical demonstration of the ability to use any other mode of communication;

(f) telegraphy knowledge is not essential to the safe and effective operation of an amateur station; and

(g) removal of the code requirement would further enhance the value of amateur radio as a voluntary, non-commercial public service.

Those who favor retaining code testing believe Morse is a reliable, economical, and efficient form of communications that may be needed in emergency situations. Some petitioners (including the ARRL) asked that telegraphy testing be required only for the Amateur Extra Class license.

The FCC said that it had considered the need for Morse proficiency in the last (1999) Amateur Service restructuring proceeding (WT 98-143) and concluded at that time that code testing should be reduced to the minimum required to satisfy the international Radio Regulations.

Article 25.6 of the Radio Regulations now requires only that countries "...verify the operational and technical qualifications of any person wishing to operate an amateur station." The Commission said it believes this requirement is satisfied by requiring applicants only to pass written examinations covering relevant subject matter.

Furthermore, the FCC agrees that Morse code proficiency is not necessarily indicative of ability to contribute to the advancement of the radio art, adding that there is no requirement that amateurs use telegraphy for communications or that they

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maintain proficiency once they pass a code test.

Operating Privileges

Prior to 2000, there was a six-class operator license structure. In the 1999 restructuring proceeding most commenters asked that the license structure be streamlined and simplified. The Commission agreed and concluded a three-class license structure would provide an incentive for licensees to upgrade. A three-class operator license structure consisting of the Technician, General, and Amateur Extra Class operator licenses was adopted. The FCC is reluctant to again change that lineup.

Recently, several petitioners asked that the FCC authorize additional operating privileges to certain existing license classes, particularly the Technician Class license. The FCC noted that the current structure of operator license classes and operating privileges was developed so that additional frequency privileges are a significant incentive for amateur radio operators to advance their communication and technical skills.

In denying requests for additional privileges, the FCC noted that it has already proposed in the ongoing Phone Band Expansion (or "Omnibus") NPRM (WT Docket 04-140) to eliminate the Novice and Technician Plus Class telegraphy sub-bands. In their place, these licensees would be authorized to transmit CW in the General Class telegraphy segments of the 80-, 40-, and 15-meter bands. If adopted, this "...would authorize Technician Class licensees significantly more spectrum in the HF bands than the petitioners request," the FCC said.

Number of Amateur License Classes

In the transition to the three-class license structure, the Commission "grandfathered" Novice, Technician Plus, and Advanced Class licensees. That meant no new Novice or Advanced Class licenses would be issued. These amateurs would, however, continue to receive Morse code examination credit and could renew their licenses indefinitely. The Commission also decided to renew Technician Plus Class licenses as Technician Class licenses with retained code credit.

At that time the Commission declined to automatically upgrade Novice and Technician Plus Class licensees to General Class licensees or to automatically upgrade Advanced Class licensees to the Amateur Extra Class operator license. In doing so, the FCC accepted the argument that licensees should not receive additional privileges without passing the required exams.

Both the ARRL and NCVEC petitions asked that a new entry-level license with some HF phone privileges be adopted. Both also proposed a one time automatic upgrade of Technician Class amateurs to the General Class, and Advanced Class to Extra. The Commission said it is not persuaded to change from its previous position.

The FCC does not believe that a new type of introductory license is necessary, because if new rules eliminating telegraphy examinations are adopted, new applicants and Novice licensees can easily upgrade to the General Class by passing two 35-question multiple-choice (Element 2 and 3) written examinations. A person who is a Technician or Tech Plus Class licensee will be able to qualify for the General Class operator license by passing only one 35-question (Element 3) multiple-choice examination. FCC denied the requests for a new entry-level license, adding, "We do not believe that these requirements are unreasonable, given the amount of spectrum available to General Class licensees."

Interestingly, we note that many new Amateur Service applicants are already taking the Element 2 and 3 written exams together. They receive a Technician Class license (for passing Element 2) and a CSCE (Certificate) for passing Element 3, the written portion of the General Class license. They hope to trade in this certificate (which is valid for a year) for a General Class license once the FCC makes a final ruling on abolishing the Element 1 code exam.

Written Exam Content

Prior to 2000, each written examination had to be composed of a specific number of questions on ten FCC-specified topics. These topics were the same as used by the FCC prior to 1983.

In the last major Amateur Service restructuring, the 1999 Restructure Report and Order, the Commission agreed that the Question Pool Committee (QPC) of the NCVEC should specify topics and organize questions by topic.

Two petitioners believe this has led to easier and less technical questions that threaten to turn the Amateur Service "...into a group of non-technical consumers, rather than a service of skilled radio operators, experimenters, and technically oriented volunteers." They

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asked that the FCC once again regulate the content of the written examinations. Another petitioner suggested that licensees demonstrate proficiency in just the types of communications they wish to utilize.

The FCC pointed out that the purpose of the written examinations is not to determine whether a person "...has achieved a particular level of skill, but rather to determine whether an individual can properly operate an amateur station." The Commission said, "the record does not demonstrate that the current question pools or examinations are inadequate for this purpose." The Commission suggested that any concerns and new questions should be directed to the Question Pool Committee of the NCVEC. The e-mail address is <qpc@ncvec.org>.

Accordingly, the FCC declined to more closely regulate the content of written examinations or to require new examinations for "mode privileges."

Repeating Failed Examination Elements

The current rules do not prohibit VEs from immediately retesting an examinee who has failed an examination. Most VECs, however, require that another testing fee be paid. Two petitioners wanted to end retesting of applicants at the same examination session.

The FCC noted that this issue was previously considered. In that decision the Commission stated that matters concerning the mechanics of examination administration generally reside with the administering VEs, and that whether to allow an examinee a "second chance" during the same examination session is a decision within the discretion of those VEs.

The rules require that a different set of questions be used when readministering failed examinations.

Certifying Volunteer Examiners

The process by which a VEC recruits VEs is not specified in the rules, but, rather is left to the discretion of each VEC. The FCC said it was not persuaded to amend the present system. The rules presently require that when examination irregularities occur, the coordinating VECs must resolve all discrepancies that occurred during the examination session and take any necessary action, including decertification of a VE.

In Conclusion

The FCC said it believed "...the public interest will be served by revising the Amateur Service rules to eliminate the telegraphy testing requirement" for all classes and asked for comment on this premise. It also said that many rule changes proposed by some petitioners are unnecessary, or are already being considered in the ongoing Phone Band Expansion NPRM (Omnibus) proceeding. The 30-page Notice of Proposed Rulemaking is at <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-143A1.pdf>.

The FCC proposal to end Morse testing will not become final until the public has had a chance to comment and the Commission makes a decision, taking those comments into account, in a Report and Order. The comment date extends to 60 days after publication in the Federal Register, which should be around the end of September. Reply comments must be made within 15 days afterward.

You may file comments using your computer through the FCC's Electronic Comment Filing System on the internet. The ECFS can be accessed at: <http://www.fcc.gov/cgb/ecfs/>. This webpage also contains links to instructions on how to submit comments and how to search for comments that have already been filed by others.

73, Fred, W5YI

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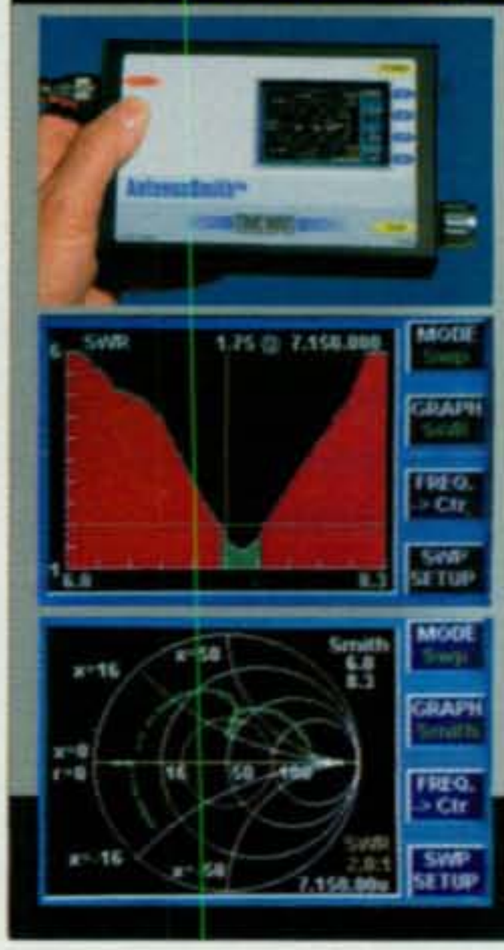

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The author titled this article "Zach and a Box," since it involved a trip to Guam with his son, Zach, and a portable station he could pack into a carry-on suitcase. Since our focus is more on the ham radio end of things, we'll call it W1UF's ...

Shack in a Box
A Mini-DXpedition to KH2

BY L. DENNIS SHAPIRO,* W1UF

My son Zach is an airlines buff. He knows all the airlines, all the routes, and it seems that he has a yen to fly every one of them. About a year ago he sent me an e-mail about Continental 957—the island-hopper. It leaves from Honolulu (KH6), stops in Majuro and Kwajalein in the Marshall Islands (V7), Kosrae, Pohnpei, and Chuuk in Micronesia (V6), and finally terminates on Guam (KH2). Departure from Hawaii is at 0700 and arrival on Guam is at 1715, for a total airline time of 14:15 inclusive of the 4-hour time gain.

I asked, "When?" Zach said, "How about in May?" I said, "Wrong time of year to go to the south seas. How about January?" He said okay, but it had to be a fast trip because of other commitments. Oh well, there goes my DXpedition. However, then he said that we would stay three nights on Guam, and that was the birth of KH2/W1UF.

W1UF and son. Zachary R. Shapiro is a rabbi at a Reform Jewish Congregation in Los Angeles.

A Shack in a Box

My plan was to put a station in a box—actually a suitcase on wheels that I could take as a carry-on bag. That way it would be safe, and as any true-blue ham would know in his/her gut regarding checked baggage . . . "My clothes, perhaps, but my radio, never!"

So began the fun of designing a station-in-a-box. I considered going the QRP route and tried it out at home, running 5 watts and trying to work DX. It takes lots of patience, good antennas, and good propagation. I would probably come out short on all three. The trip would be time-constrained, the antenna would be what would fit in the box, and the sunspots would be few and far between. The decision? 100 watts.

What radio? It would have to be one of the current lightweight, mobile-style, HF-through-440 all-mode transceivers. After spending an afternoon at HRO comparing the operating feel (and the size and weight) of three current radios, I chose the Yaesu FT-857D, mainly because of size and weight (6.1" × 2" × 9.2", 4.6 lbs.). I opted for a 500-Hz Collins mechanical filter to provide additional adjacent-channel selectivity to go along with the DSP (digital signal processing). As it turned out, this was a wise choice.

The supplied microphone worked fine, but I wanted my Heil headset for three reasons: I like the audio characteristics of the HC-5 element, I needed to have a hands-free setup along, and I needed the privacy offered by the headphones so that the non-ham (Zach) could keep his sanity. Also, I already owned it.

The power supply could be a rental car's 12-volt battery, but I could not count on being able to spend the wee hours outdoors. What I needed was a small, lightweight switching power supply capable of running a 100-watt radio. As it happened, I had a virtually new Astron SS-30 that was my "standby" supply for the home QTH. It is $3^3/4$" × 7" × $9^5/8$" and weighs 5 lbs.

Now came what was probably the weakest link in this communications project—the antenna-in-the-box. I did not want to string wires or assemble arrays. How about a simple vertical? Yaesu offered a matching motorized vertical, but I wanted to keep it simple, lightweight, and something that had no circuitry that could misbehave. HRO showed me a very simple, lightweight, C-clamp mountable (C-clamp included) variable-inductor-loaded vertical by Superantenna, the MP-1. It came in a 15" × $3^1/2$" × $3^1/2$" box that weighed, perhaps, a couple of pounds. It seemed like just the thing—a simple device that I could understand. Just adjust the sleeve until a match is achieved. Included was a set of radials that also fit into the box along with the mounting bracket and the C-clamp. The instruction sheet was one side of one page. The antenna box had room for some basic tools—pliers and a few different screwdrivers. For the flights, the tools were packed in

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e-mail: <LDShapiro@comcast.net>

Station elements: The antenna and SWR meter are on the left, power supply and transceiver on the right. The keyer shown arrived after the fact. Automotive-type spring clips are for temporary connection to a car/truck battery.

my checked luggage, since all or some of them would not pass security for hand-carry at the airports.

Finally, I needed a meter located at the antenna to measure SWR so that I could adjust the inductor sleeve and see the results without having to go back to the radio's panel. A visit to the local CB store for various lengths of coax also revealed an $18 SWR meter by Vanco that was spec'd at 1.7 to 30 MHz and looked as if it would handle the 100 watts (and it did).

Dry Runs

The radio worked like a charm from the home QTH on the switching power supply (which did not add to the noise level on any of the bands). Connected to both my log periodic array and my G5RV antennas, I worked DX on both SSB and CW, from 80 through 12 meters, and received unsolicited positive comments on the audio. The FT-857D operated as advertised, and the Collins filter earned its keep on 80 and 40 meters CW. Learning the protocols of the radio took some doing, but all in all it worked out to be a fine choice.

Next came the mobile test. It was the weekend of the North American QSO Party and the band conditions were good. I packed the radio and antennas in my Jeep Liberty and set off for Larz Anderson Park in Brookline, which has a hilltop with a vista overlooking downtown Boston. Raising the hood, I connected the power cable to the battery with automotive-type spring clips and connected the radio. I C-clamped the vertical to the roof rack of the Jeep, set the four radials drooping over the car roof, set the radio on a clear spot on 15 meters, 10 watts key down and, looking at the SWR meter, adjusted the sleeve. It was an iteractive process—getting it close, removing my hand, seeing the SWR change, tweaking the sleeve, etc. SWR came down to about 1.5:1—good enough. The first signal I heard was from a W7 contest station in Seattle on SSB. I gave a call and he came right back. It was after I worked him that I realized that I was still set on 10 watts! Maybe QRP is not so bad.

Nontheless, I cranked it up to 100 watts and proceeded to work a host of stations. I also tried 17 and 20 meters with good results. It was not as easy as with the beam—but it was good enough.

The Trip

On January 19th I flew from Boston to Newark and connected with Continental 15 nonstop to Honolulu. Bags were checked through from Boston. The station-in-a-box was in my hand-carry rolling suitcase. Arriving in Honolulu at 1920 after the

The station will fit in the pilot's chart case on the left, or in the larger carry-on wheeled bag on the right, which has room for foam protective padding. The ruler is a 12-incher.

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Japanese travelers awaiting departure at Kosrae, Micronesia after visiting the island to mourn the loss of their fathers there in WW II (see text for details).

11-hour flight from Newark, I met Zach and we went to our hotel. We were scheduled out at 0700 on the 21st, giving us one day on Oahu.

We got an early start, getting to Pearl Harbor before the lines were long, viewing an excellent film and taking a tender to the site of the sunk *U.S.S. Arizona*. The Japanese and other Asian visitors were as numerous as the Americans and other westerners. The Arizona and Pearl Harbor memorials are meaningful to all.

We then headed north across the island to drive the periphery. At the peak past Schofield Barracks, I found a corner of a parking lot near the Dole Pineapple store where I set up the transceiver, C-clamped the vertical to a fence post, and tried my hand at radio. Unfortunately, it turned out to be a noisy site and I was able to make only one SSB contact on 15 meters with a JA. It was hot and the conditions weren't right. I shut down and we toured the island.

The next morning we were up very early to make the 0700 flight and headed westward. The flight was an extraordinary experience. We spent just 45 minutes at each stop but had wonderful aerial views of lagoons, atolls, reefs, and blue, blue waters from the Boeing 737. Every stop is a diving mecca. Kwajalein is an ICBM tracking station, and that part of the atoll was built up in western style—green grass, golf, etc. The other islands were more like what we expected from tropical Pacific islands.

People in the terminals were either islanders, vendors, divers, and/or in-transits, as we were. Sitting on benches at Kosrae were seven elegant-looking Japanese, three men and four women. Two of the men were in suits and ties. All had flowered garlands on their heads. They were waiting to board our plane. I approached the men and asked if anyone spoke English. One man spoke up. I asked him whether he was there on holiday or to dive. He said "No, we are here because our fathers were lost here in battle and we came to mourn. There are no cemeteries. We came because we wanted to see where they were when they died."

We arrived on Guam at 1715 local time on January 22nd. Guam is UT + 10, making it 0715 UT. We picked up our rental car and went to the hotel. I asked for a high-up floor and we got a room on the 12th floor of a 14-story tower. I was pleased to see that we had a view of the bay and there was a porch with a steel railing.

Time for Some Radio

The sun was going down. It had been a long day. Was I tired? Not if I had a radio to use and a station to get on the air. Out on the porch were a table and a couple of chairs. I had a "vertical" antenna. There was no way to mount it vertically, since the roof of the porch was not high enough. Furthermore, the railing was square, so I could clamp either up or out. Up was out, so out was in. How about a horizontal "vertical"? I set up the antenna as shown in the photo. It had a beautiful view of the bay, but would it radiate? Would it even tune? I thought, let's give it a try.

I set the SWR meter on a porch chair and connected it to the antenna with a 3-foot length of coax and to the radio via a 12-footer through the end of the sliding door. Maybe the railing would serve as ground. I left off the radials. It tuned.

Time 1005 UT, January 22nd. Airport to QRV in 2 hours. Twenty meters SSB.

View from the window at KH2/W1UF. The "vertical" near-base-loaded whip, all of about 65 inches long, is mounted horizontally on the railing. The railing served in lieu of radials for this station, which operated on 40 through 15 meters.

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The Wullenweber antenna on Guam as seen from the air. More details on this extraordinary receive-only antenna are at <http://www.mindspring.com/~cummings7/wullen.html>.

Band was open. CQ from VR2XMT. "This is KH2/W1UF." Charlie came right back with a 57. Next was PY3GT, followed by VK4YJN. I logged off at 1149 UT with CP5HK. In between I worked P29, HSØ, and logged a 59 report from Alex in Laos at XW3DT. Funny, no JAs. I have to say that for a "right coaster" from New England, this was a DX wonderland.

The morning of the 23rd 15 meters was open to VK and JA. After running JA's I called for stateside, and at 2300 UT 22 January (0900 23 January local), I logged K7PRW, Robb in Nevada, followed by AD5HR, John in Texas. It was time for Zach and me to tour Guam, which we did by driving the periphery, which makes for a fine day's outing. Always having an eye for antennas, I noted the monster curtain arrays of two major shortwave broadcasting installations, and later from the aircraft, a Cold-War era Wullenweber array at what I believe was the naval communications system's receiving site. This highly directional, 360-degree steerable, broadband receiving antenna is purported to have cost close to $1 million back in the days when that was a lot of money—and is a dying breed. (I don't think any of these have been built in at least 25 years, and money to keep them up and running is scarce or nonexistent.)

Zach continued his travels on January 24th. I stayed another day.

Having had success on 15 and 20, I spent the last evening trying my hand at 40 meters CW. I had ordered a keyer and a cable before I left. The cable arrived, but not the keyer. I had taken along my ancient and trusted straight key, though. Would the antenna tune on 40 meters without radials? Not only did it tune, the SWR was closer to unity than on the higher bands. Would it communicate? I logged JAs, RAØ, HSØ, and W7. My best stateside DX was in the home stretch on 17 meters before going QSY back to W1—Jeff, KB2M, in New Jersey at 2215 UT on January 24. The greatest distance was to PY2, which is in excess of 11,000 miles.

Overall, I made 91 QSOs, 11 of which were CW and 80 SSB. I worked 20 countries and all continents except Africa, which was not heard.

Bottom Line

Radio has always been a wonder for me. Communicating at a distance without wires is still magic—in spite of Maxwell. Putting a station in a suitcase, traveling to the other side of the world, and communicating back to home on a 67-inch stick is one of the wonders of the world. And—you and I can do it.

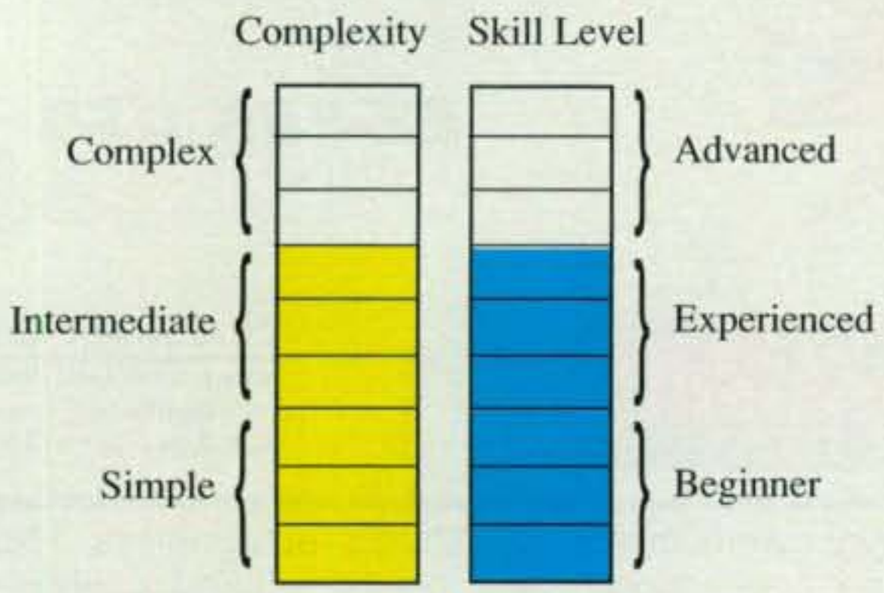
This was *fun*, the ham equivalent of a barrel of monkeys. Amazing—look at the photo of the antenna and its position. I can't wait for Zach to call me again with a new adventure.

For those of you who like to "roll your own," here's a receiver project with a few twists on traditional designs, starting with the coupling in the bandpass filter of the antenna input circuit.

The GRX-1 Receiver
A Different Approach

BY JAMES W. GRAVES*

CQ Project Meter



Introducing the *CQ* Project Meter

The *CQ* Project Meter is a snapshot indicator of the editors' view of how complex a project is, and the suggested skill level of the builder. It is intended only as a rough guide and is thoroughly subjective. For example, we feel that this project is of intermediate complexity and is most suitable for experienced builders because it includes discussions of each circuit and templates for etching your own circuit board (pre-etched boards are available; see end of article), but does not offer a step-by-step assembly guide that might be needed by builders with less experience. In addition, tuning requires a signal generator with a scope or meter, something more likely to be found on the bench of an experienced builder than a beginner. Please let us know if you find the *CQ* Project Meter to be helpful (even if you disagree with our specific classifications). —*W2VU*

This receiver is meant to showcase a new type of mixer circuit I developed and to show my ideas on other circuits now in use. I wanted a 20-meter CW receiver I could also use to go up the band and listen to SSB QSOs. While there is no VFO on the 4" × 5" board for this project, it will be included on the 4" × 5" inch board I am developing for a 5- to 20-watt CW transmitter that will piggyback over the receiver board. For now, any VFO that tunes from 5 to 5.35 MHz and develops 6 volts peak to peak into 100 ohms will do fine.

**300 NW 12th St., #317, Oklahoma City, OK 73103*

The Bandpass Filter Circuit

The bandpass filter in the antenna input circuit uses what I call core center coupling. Your typical double-tuned top or bottom coupled circuit gives asymmetrical skirt selectivity. Also, with this much coupling, tuning one transformer also tunes the other. With core center coupling the skirts are more symmetrical and the windings are isolated from one another. This means you can tune one transformer without affecting the others' tuning.

Doing the math on the filter, we need a bandwidth of 350 kHz at 14.175 MHz. This means a loaded Q of about 40 is needed. Four times this amount for an unloaded Q of 160 can be met with an Amidon T37-6 core. Thirteen turns of #26 magnet wire will give us an inductance of .5 µH, which puts us in the ball park with a reactance of about 44 ohms. Two turns of the same wire over the cold end of the coil will give us a 50-ohm winding. Capacitance of about 280 pF is needed to resonate with the coil at 14.175 MHz. A 220 pF np0 ceramic in parallel with a 12-70 pF trimmer will do the job.

The core center coupling is a #22 or larger wire size through the "donut hole" centers of the toroids and soldered to the top ground plane at both ends. Putting the wire in the center of the core means the distance to the windings around the toroid provides very little capacitive coupling to the center wire. All the magnetic lines of force generated by the tuned circuit winding around the first toroid go through the center "donut hole" of that toroid. As these lines of force vary with input signal strength, they are cut by the center wire. Current is generated in the center wire and flows along the wire through the second toroid "donut hole" to the ground plane and back through the first toroid to complete the circuit. Here again there is very little capacitive coupling between the center coupling wire and the second toroid because of the spacing. The signal induced in the center wire generates lines of force in the second toroid which are cut by the windings of the second tuned circuit. This causes current flow in the tuned circuit of T2, which is magnetically coupled to the 50-ohm output winding and on to the mixer.

When you are tuning the bandpass filter, remember that the tuned circuits are effectively isolated. In a capacitive top-coupled filter, because of the close coupling, you effectively tune both circuits whenever you tune either one and you get

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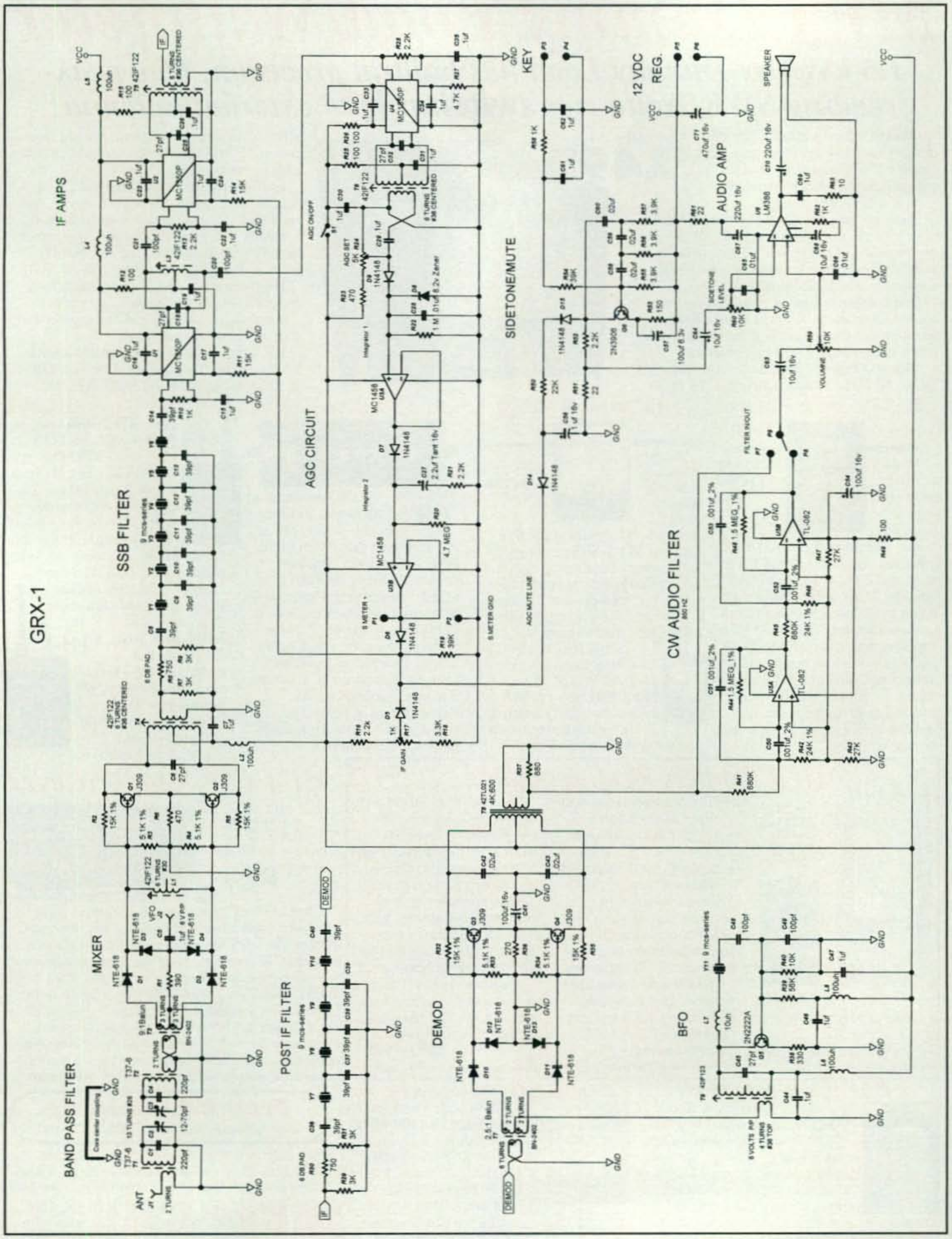

Fig. 1– Schematic of the GRX-1 receiver. See discussion in text for explanation of the core center coupling in the band-pass filter.

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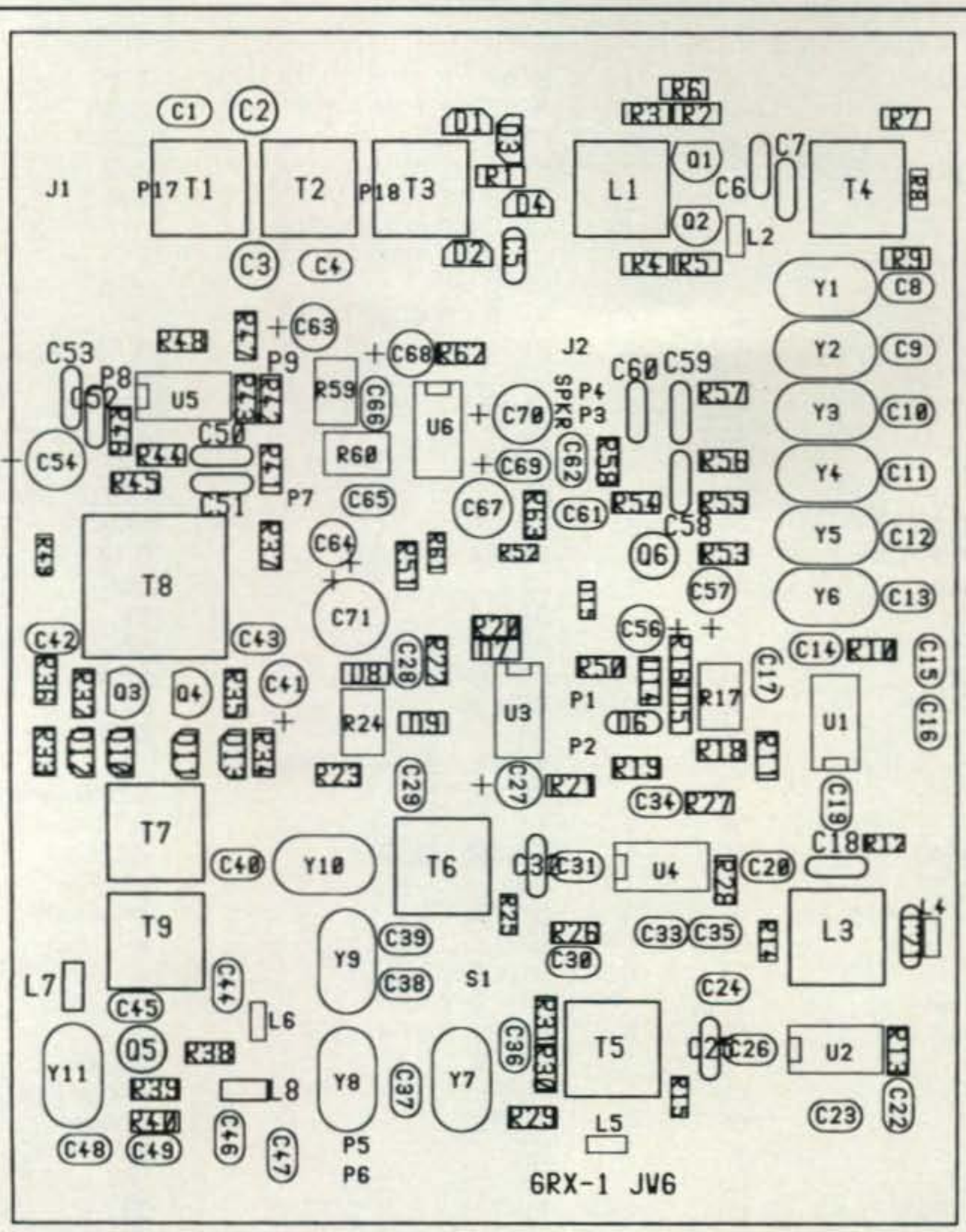


Fig. 2– Parts layout on top of circuit board. See fig. 3 for silk-screening template.

a well-defined peak. In this filter the tuned circuits are isolated low-Q tuned circuits and do not interact much. You have to go off frequency several hundred kHz before you see significant change. A signal generator with a scope or meter is needed to tune these circuits.

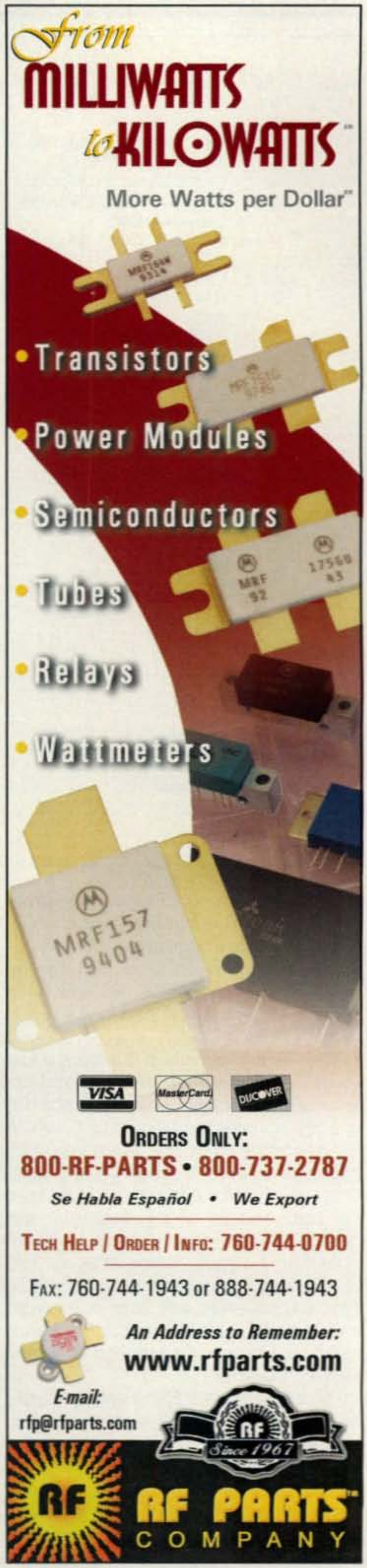
The Mixer Circuit

The mixer uses four NTE 618 varactor diodes in a balanced configuration. These diodes exhibit 440 pF at 1 volt of back bias and 90 pF at 8 volts of back bias. A Q of 200 is claimed. The capacitance versus voltage curve is a square-law curve and is close to the perfect curve for mixing two signals to produce a third. (Alternative diodes: Motorola's MVAM108's have been discontinued but can be used if you have them; Mitsubishi makes a 1SV149, which is also suitable.)

The antenna signal is fed into the mixer in push-pull through the 9:1 step-up balun to match the 50-ohm output of the bandpass filter to the 450-ohm input of the mixer. The VFO sine wave is fed into the mixer serially, and the two signals never see one another except across the mixing medium.

This provides isolation between the input port and the VFO port. The 390-ohm resistor R1 helps stabilize the load the VFO sees and provides a ground return for the back bias voltage on D3 and D4.

The mixing medium can be described as a four-arm bridge circuit with the output in balance for the serial VFO input, but the bridge becomes unbalanced with a push-pull input signal. This imbalance is not linear with respect to voltage change versus imbalance, but is a square-law change in imbalance caused by a linear change in input signal. This provides the non-linear mixing medium. The 3-volt back bias for the diodes is provided by the resistor string R2 and R3 and their opposite string R4 and R5. With 6 volts peak-to-peak VFO input, 3 volts is enough back bias to



Parts List

Item	Qty	References	Value
1	4	C50, C51, C52, C53	.001 µF 2%
2	3	C28, C65, C66	.01 µF
3	5	C42, C43, C58, C59, C60	.02 µF
4	22	C5, C7, C15, C16, C17, C19, C22, C23, C24, C26, C29, C30, C31, C33, C34, C35, C44, C46, C47, C61, C62, C69	.1 µF
5	1	R22	1 M
6	1	C56	1 µF 16v
7	2	R44, R48	1.5 meg 1%
8	1	R63	10
9	5	R12, R15, R25, R26, R49	100
10	4	C20, C21, C48, C49	100 pF
11	2	C41, C54	100 µF 16v
12	1	C57	100 µF 6.3v
13	5	L2, L4, L5, L6, L8	100 µH
14	3	R40, R59, R60	10K
15	3	C63, C64, C68	10 uf 16v
16	1	L7	10 µH
17	2	C2, C3	12-70 pF
18	1	R53	150
19	2	R11, R14	15K
20	4	R2, R5, R32, R35	15K 1%
21	4	R10, R17, R58, R62	1K
22	6	D5, D6, D7, D9, D14, D15	1N4148
23	5	R13, R16, R21, R28, R52	2.2K
24	1	C27	2.2 µF tantalum 16v
25	1	T7	2.5:1 balun
26	2	R51, R61	22
27	2	C1, C4	220 pF
28	2	C67, C70	220 µF 16v
29	1	R50	22K
30	2	R42, R46	24K 1%
31	1	R36	270
32	2	R43, R47	27K
33	5	C6, C18, C25, C32, C45	27 pF
34	1	Q5	2N2222A
35	1	Q6	2N3906
36	1	R18	3.3K
37	3	R55, R56, R57	3.9K
38	1	R38	330
39	1	R1	390
40	2	R19, R54	39K
41	12	C8, C9, C10, C11, C12, C13, C14, C36, C37, C38, C39, C40	39 pF
42	4	R7, R9, R29, R31	3K
43	1	R20	4.7 meg
44	1	R27	4.7K
45	5	L1, L3, T4, T5, T6	42IF122
46	1	T9	42IF123
47	2	R6, R23	470
48	1	C71	470 µF 16v
49	1	T8	4K:600
50	4	R3, R4, R33, R34	5.1K 1%
51	1	R39	56K
52	1	R24	5K
53	1	R37	680
54	2	R41, R45	680K
55	2	R8, R30	750
56	1	D8	8.2v zener
57	11	Y1, Y2, Y3, Y4, Y5, Y6, Y7, Y8, Y9, Y10, Y11	9 mcs series
58	1	T3	9:1 balun
59	4	Q1, Q2, Q3, Q4	J309
60	1	U6	LM386
61	3	U1, U2, U4	MC1350P
62	1	U3	MC1458
63	8	D1, D2, D3, D4, D10, D11, D12, D13	NTE-618
64	8	P1, P2, P3, P4, P5, P6, P8, P9	one pin
65	2	J1, J2	Phono jack
66	1	SPKR	Speaker
67	1	P7	SW_SPDT
68	1	S1	SW_SPST
69	2	T1, T2	T37-6
70	1	U5	TL-082

keep the diodes out of forward conduction with a cushion of more than 1 volt. These resistor strings also provide a 25-percent negative feedback path for the two IF amps, Q1 and Q2. R3 and R4 in series provide the 10K load for the tuned circuit at L1.

The two signals mix in the square-law medium and produce the sum and difference frequencies. The difference frequency is selected here by L1, which will resonate with the series-parallel capacitance of D1 through D4 at 9 MHz. This capacitance is fairly constant at the top and bottom of L1, because the diodes are connected back to back. They show a capacitance of about 180 pF across L1 at a back bias of 3 volts. This capacitance will vary somewhat with the VFO sine wave, but the bandwidth at L1 is wide enough to mask these variations.

Resistors R3 and R4 in series are the load for the 9-MHz IF signal, and this signal will appear on the gates of the two JFETs, Q1 and Q2. The IF signals on the gates of the two JFETs are 180 degrees out of phase and of equal amplitude. The VFO signal, however, is in phase and equal in amplitude at the two JFETs gates. The common source resistor for the two JFETs, R6, is unbypassed, and the VFO signal will produce current through the two JFETs and the unbypassed common source resistor to develop a signal equal to the VFO signals on the gates. There will be little difference in amplitude between the signal on the gates and the signal across R6. Little gain will be realized for the VFO signal, and any VFO signal that appears on the drains will cancel in the push-pull output transformer, T4. This isolates the VFO port and the output port. *Any mixer products that are in phase and equal in amplitude will be attenuated the same as the VFO signal.* The two out-of-phase and equal-amplitude IF signals on the gates of the two JFETs will produce no current through the source resistor, R6, as they will cancel at the top of R6. This is the condition that would exist if the resistor were bypassed. We then have a *virtual bypass capacitor* at the top of R6, but only for signals that appear on the gates of Q1 and Q2 180 degrees out of phase and of equal amplitude.

The IF signals are amplified by Q1 and Q2 and combined in the push-pull output transformer. The resistor strings R2/R3 and R4/R5 provide 25-percent negative feedback for the JFET amps. This much feedback helps reduce nonlinearity in the JFET outputs and makes the circuit less dependent on an individual JFET match. A load of 4K ohms is provided by T5 for the two JFETs and a 1K-ohm output winding feeds a 1K-ohm 6-dB pad to help isolate the mixer from the crystal filter.

The 6-dB Pad and Crystal Filter

The 6-dB pad is a scaled-up version of the 50-ohm 6-dB pad in the *ARRL Handbook*. My crystal filter is an idealized version of the familiar ladder-type filter used everywhere today. I buy 20 Vishay crystals at less than 50 cents apiece from Mouser and match them within 100 Hz with my digital dial readout and a crystal-oscillator board with a crystal holder into which I can plug crystals. I then use my communications receiver and BFO to match them as closely as possible by ear. I have no

equipment to find the Q or series resistance of the crystals, or to tell their frequency with any certainty. The 1K-ohm impedance is an educated guess. If you do know the impedances of your filter, just change the impedance ratio of T4 to match, and rescale the 6-dB pad. Resistor R10 should also be changed to match the output impedance of the filter.

These crystals *must* be soldered to the board or the IF will oscillate. I use care and a hot iron and I have not had any problem with this. Only one corner of the crystal needs to be soldered and should be cleaned with a wire brush and pre-tinned.

The IF Amplifiers

The IF amplifiers are MC1350Ps and can give you 80 dB of clean, controllable gain. This is possible only if the amps are properly decoupled and all impedances are matched. Any mismatch can cause the amps to produce parasitic oscillations or to become regenerative due to the SWR return signal getting back into the high-gain amps. This will cause the amps to go into compression and lose a lot of the 80 dB of gain. Any radiation from the BFO will also cause this condition. This receiver is well laid out, but all ground returns from the individual components must be soldered on both sides of the board. Plated-through holes would help here, but they are very expensive and Far Circuits doesn't do plated-through holes.

Both amps are AGC controlled, but the second amp is not in the AGC-gain loop. This allows for more control of the signal level. Taking the AGC IF signal from the output of the first IF helps to further isolate the AGC circuit from any errant BFO signal.

There are two RF chokes in the VCC decoupling line to the amps. These are required because the IR drop in two 100-ohm resistors would be excessive and reduce the available VCC at the first amp to about 8 volts. Each amp draws about 15 milliamps.

The last IF amp feeds a 6-dB pad that helps stabilize the amp and the post-IF filter that follows. There is excess gain in this receiver and this is the best place for a 6-dB loss. The again-idealized filter is built like the first, and everything said about the first filter is pertinent here. The post-IF filter reduces the noise from the IFs and helps reduce any BFO signal fed back through from the demodulator. One thing to realize is that while the individual crystals in each filter must be matched to one another, the two filters need only to be matched with-

(Continued on page108)

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math's notes

BY IRWIN MATH,* WA2NDM

Electrical-Safety Considerations

Many of the readers of this column are avid experimenters, and as a result, various types of connections to the household AC power line are made quite often. The inherent dangers present when working with this power source are always of concern (and very real), so we thought it would be a good idea this month to review what these dangers are, why they come about, and how to prevent nasty and sometimes fatal shocks. First, however, a little background.

Fig. 1 is a schematic diagram of the typical wiring scheme from the power utility to our homes. The high voltage that is distributed "down the block" can range from 440 to 1200 volts or more, but since this is isolated and stepped down by the distribution transformer provided by the power company, it usually is not of much concern to us.

The 240-VAC stepped-down voltage is what is actually conducted through the so-called "service drop" to our homes and is what we are concerned with. The main amateur-related hazard outside the home occurs when one erects an antenna in such a way that it can come in contact with either the service drop or the actual distributed high voltage if it is carried by conductors on utility poles. After passing through the electric-meter box, the 240 volts are fed into an "electrical panel" where they are distributed throughout the rest of the home via individual "branch circuits." Liberal use of circuit breakers or fuses protects the individual branch circuits so that "shorts" in one branch do not affect the others. As one can see from the schematic, the source is center-tapped, providing 120 volts on either side of center and, when needed, the full 240 volts across the outside leads. Furthermore, the center tap is always connected to earth ground outside the home (by the power utility) and often inside the home as well. This connection is usually made to a cold-water pipe or actual ground rod.

The grounded center-tap conductor is commonly referred to as the "neutral" conductor, while the two 120-volt conductors are referred to as the "hot" leads. In all modern installations a third conductor is employed for safety purposes. This is called the "earth ground" and is also connected to physical ground at the home. Fig. 2 shows the common household electrical outlet as well as the various colors of the connecting wires and hardware that are normally employed. These are the U.S. versions and are regulated by the National Electrical

*c/o CQ magazine

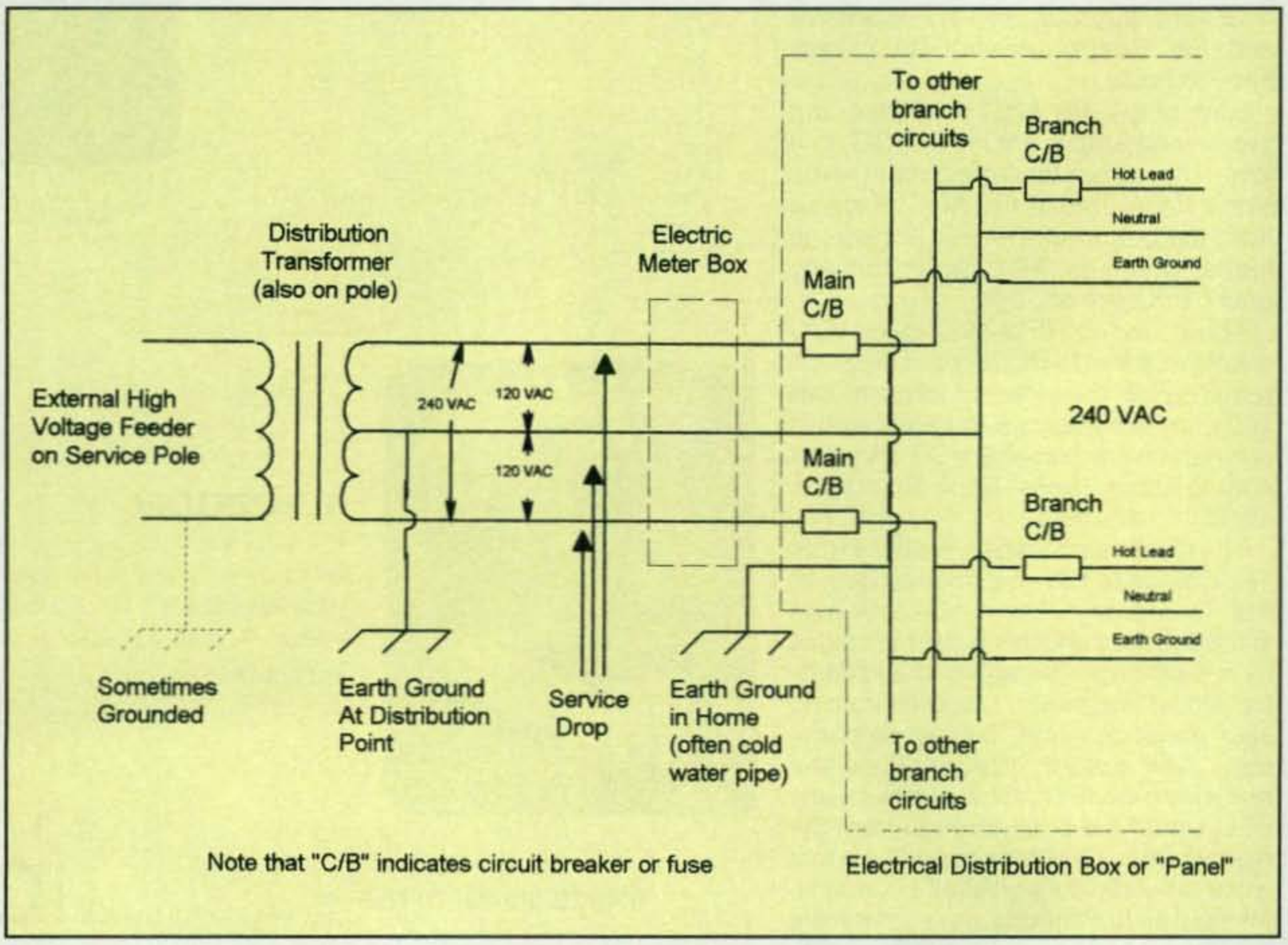

Fig. 1– Schematic of a typical residential power system.

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Code. In other countries other color schemes are used, but the general idea is the same.

While the "normal" line voltage present in the branch circuits is often called 115, 117, or 120 VAC, this is only a nominal value. In reality it can (and does) vary from as low as 105 volts to as high as 127 volts, depending on the total load drawn. In some cases the power utility purposely reduces the voltage during peak-demand situations to prevent damage to their generators.

It is a documented fact that if 20 to 100 microamperes of current flow directly through the human heart, it can force the heart to go into a non-synchronized condition called fibrillation. This will interfere with the normal rhythm of the heart and cause an erratic beat and blood flow and can quickly lead to death! Obviously, is important that this never happen! We have just seen, however, that one side of the AC line is at ground potential through two separate conductors. It only takes the "wrong" type of accidental contact to the "hot" lead while standing on the ground to complete the circuit, as shown in fig. 3. You will notice that the so-called "wrong" type of contact is via any two points on the body that result in a potential current flow path through the heart.

I have gotten shocks in the past, and you may ask how I have lived to tell the tale. The answer (in addition to luck) is that the resistance of my body was high enough so that the current flow (directly through the heart) did not exceed the danger level. Keep in mind that tissue and various other electrically conductive liquids in the body surround the heart, so in reality it can be thought of as a sensitive "microampere fuse" shunted by a lot of external resistance as shown in fig. 4. In order for deadly current to flow directly through the heart itself, the path has to be of low enough resistance and the applied voltage has to be high enough to exceed the danger level. When one stands on a wet concrete floor with conducting shoes, resistance to the feet is low. When one has a cut or abrasion that breaks the skin, resistance is low. When one sweats or is out in the rain, resistance is also low. However, remember that although 12 volts (such as found in an automobile) is not high and cannot normally force much current to flow through the body, 120 volts (220 volts in Europe and other countries) is, so be sure to keep this in mind and *exercise extreme caution*.

For safety reasons, the green ground wire in modern outlets (not the white neutral) is usually connected to any

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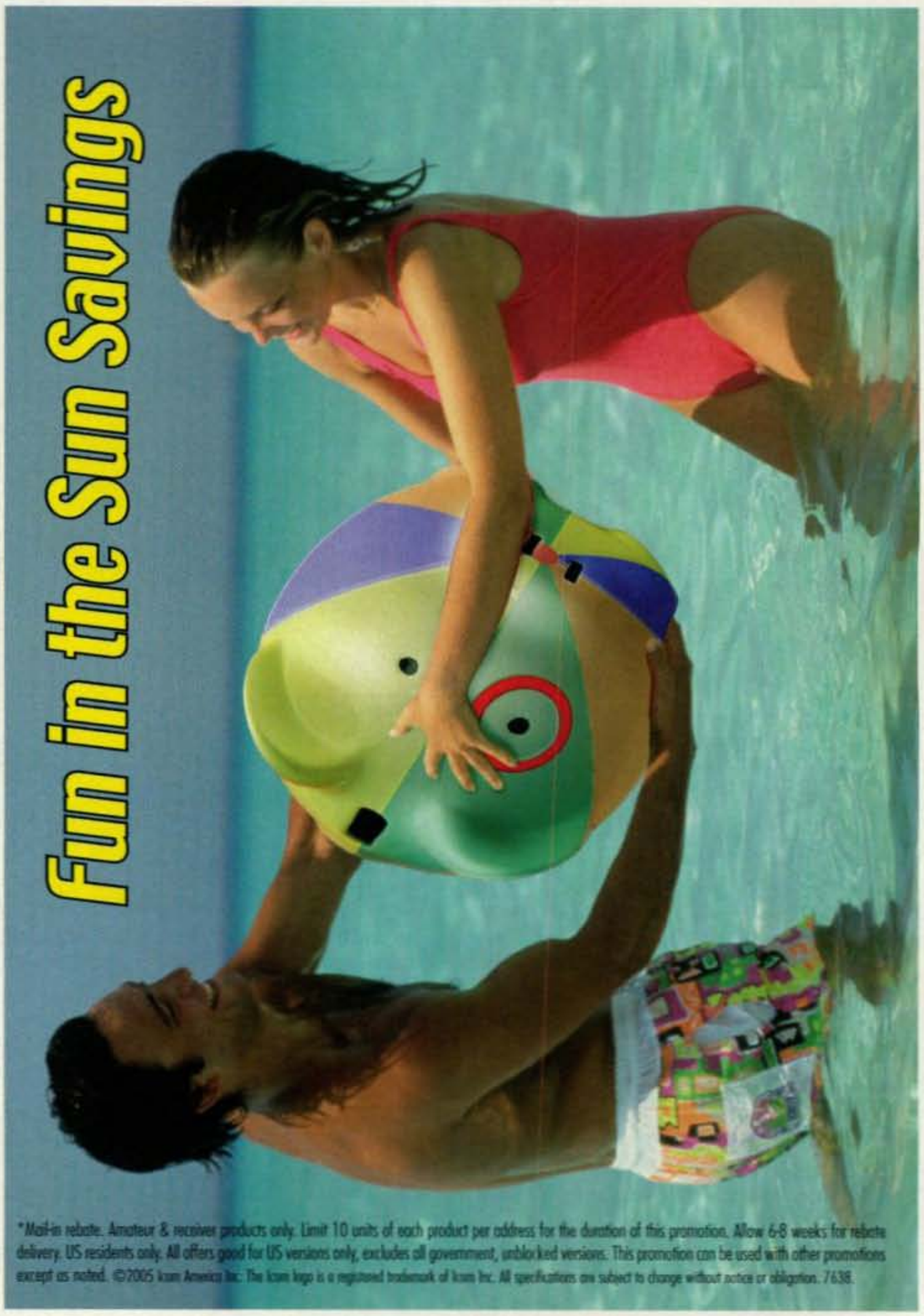

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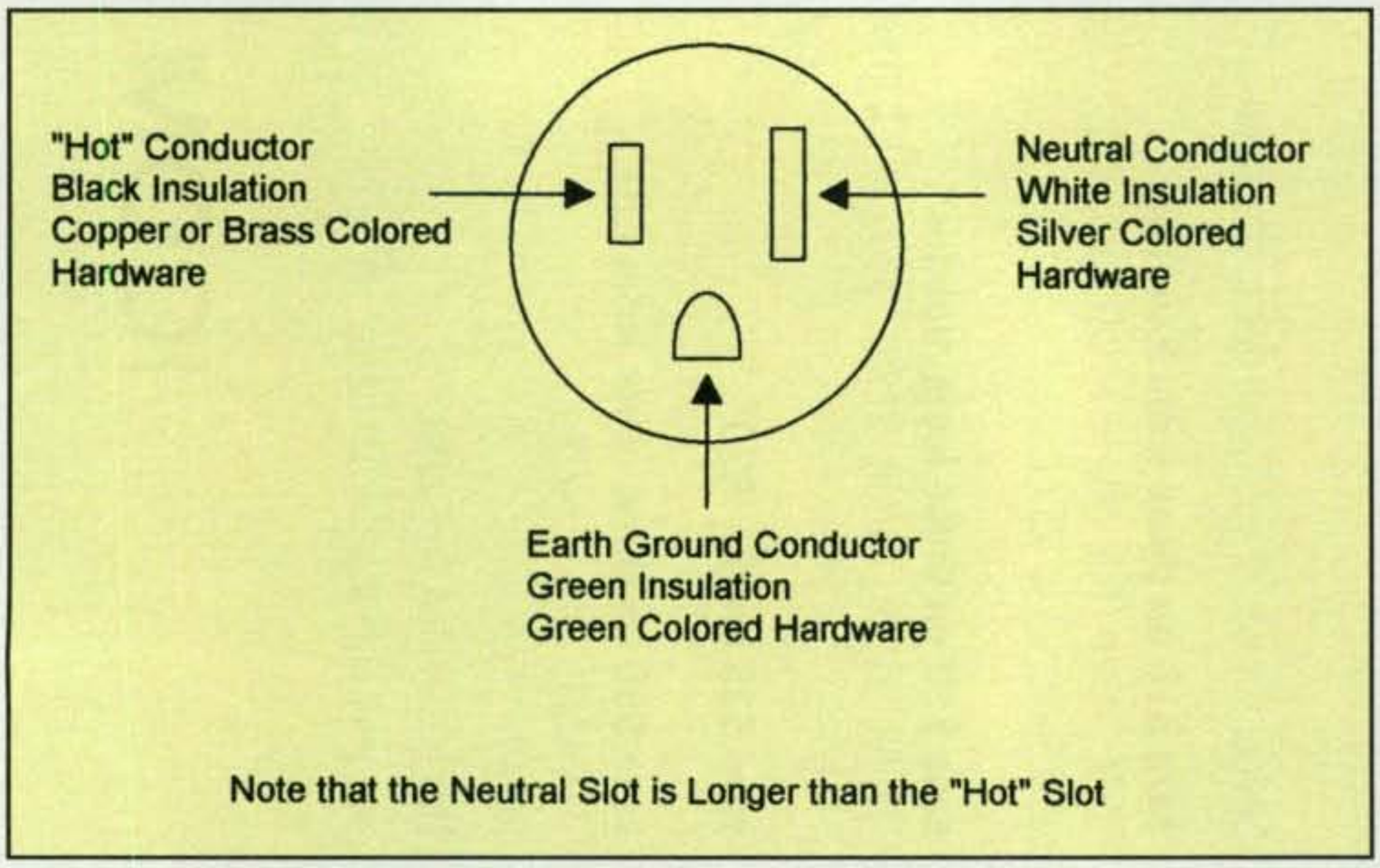

Fig. 2– The common 115- or 12-VAC outlet.

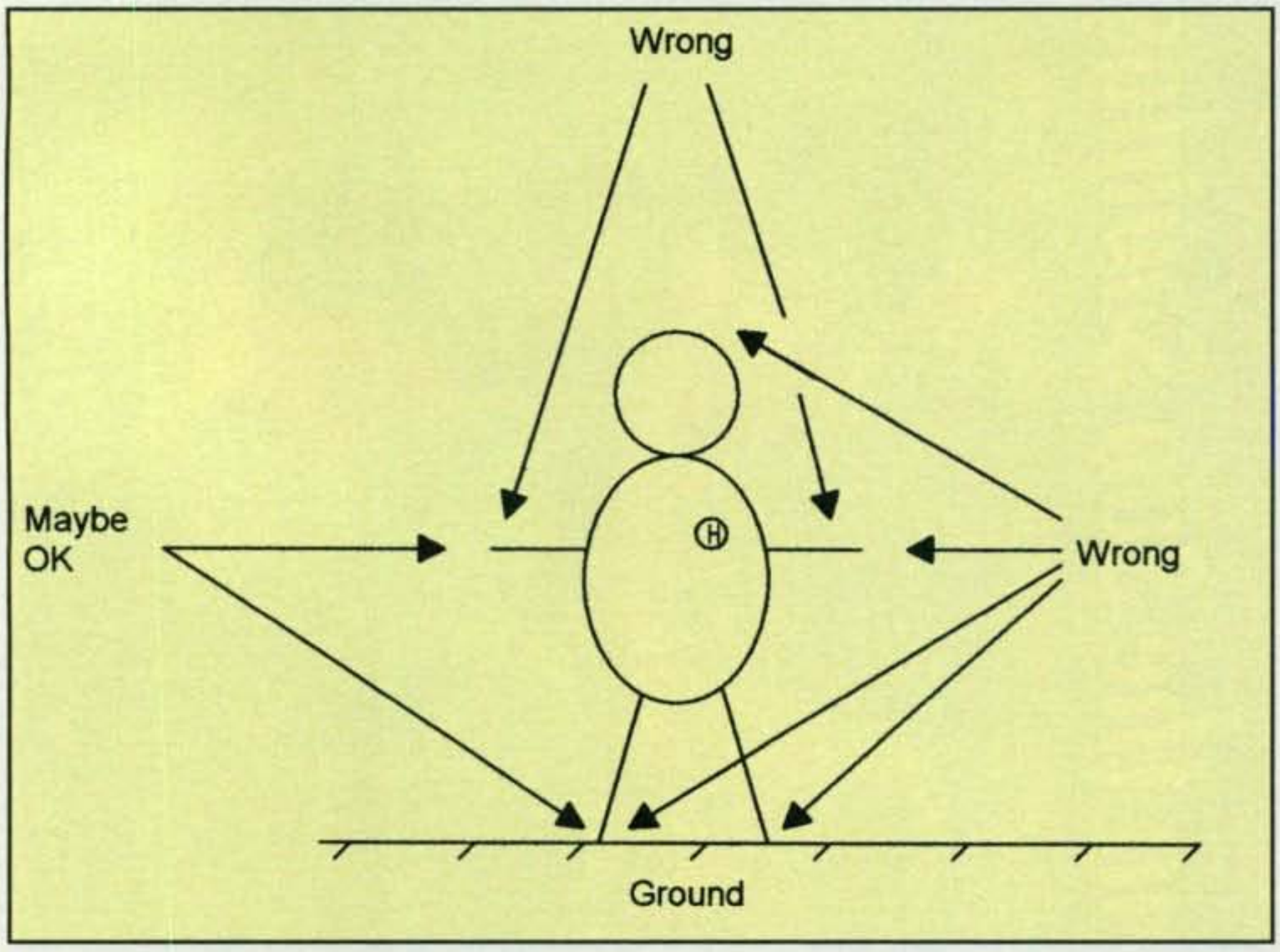

Fig. 3– Some common current paths through the human body.

metal portion or part of an enclosure with which the user may, or will, come in contact. Similarly, the neutral wire is connected to the largest metal surface within the device that is part of the "live" circuit. The hot lead is connected to the least exposed portion of the internal circuit. This is done so that if the "hot" lead ever accidentally becomes disconnected inside a line-powered piece of equipment when it contacts any internal or external metal surface, it will be shorted via the neutral or ground wire and immediately blow the fuse. A person who happens to be in contact with the same metal surface at the same time that this happens will already be grounded (via the earth ground wire) and will feel nothing. In many cases, however, the hot and neutral wires in the electrical outlet become reversed due to carelessness during installation, and the degree of safety is reduced. Many homeowners do the wiring themselves when installing or moving wall outlets and either get confused or simply don't pay enough attention to the proper connections.

The circuit shown in fig. 5 is a simple tester that can be built to check existing outlets for this problem. If the "OK" lamp lights, the outlet is wired properly. If the "DANGER" lamp lights, the neutral and "hot" leads are reversed and should be corrected. If both lamps light, the earth ground is missing. Such a device can easily be built within the plug body itself and can literally be a life saver.

Some older homes may not have three-conductor AC outlets, and I personally have seen many of the small three-prong to two-prong adapters used with appliances in these situations. I also have seen the center earth ground prong cut off a three-prong plug to make it fit properly into such an outlet—incredible but true!

If this is your situation, there are only two choices if you really want to be safe. The first is to actually use the adapter, but make absolutely sure that the little ground-lead wire coming out of the adapter is securely connected to the mounting screw that holds the outlet plate in position. Then using the tester of fig. 5, check to make sure the outlet plate is actually grounded. The second and much better choice is to replace the entire outlet with a more modern version. The mounting holes are the same, and there is almost always some earth ground connection present within the outlet box either through the metallic jacket of BX cable or conduit (when used), or via a separate bare ground wire. Believe me, the small amount of work involved can be worth your life some day. Also, *when changing outlets be sure to turn off the appropriate circuit breaker or fuse to be safe.*

So much for grounded equipment. There are many devices that only have a two-prong plug and these should be treated with extreme caution. The two prongs conduct the hot lead and the neutral return. There is no third ground wire. These devices usually are manufactured so that there are no external metallic surfaces with which to come in contact. On some of these the prongs are of different widths to attempt to add some modicum of safety, but this is marginal at best. The correct thing to do if you have such a device is to replace the line cord with a three-conductor version and ground whatever metal surfaces with which you might come in contact. Many older amateur transceivers from the mid 1970s through late 1990s were built this way. In fact, my Kenwood TS-530S originally had a two-conductor line cord that I replaced with a three-conductor version. The earth ground wire was then

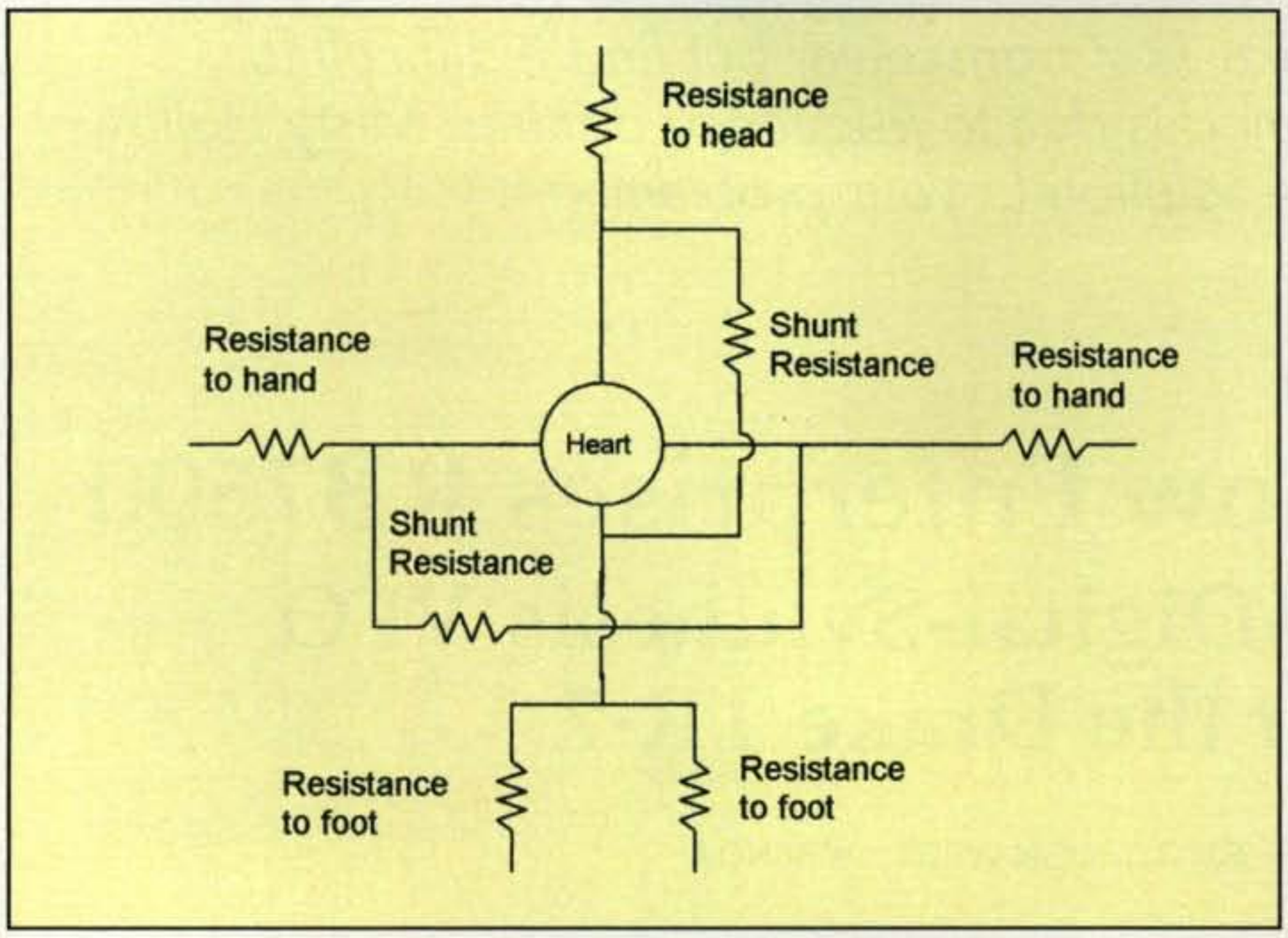

Fig. 4– The physical "circuit" of the human heart.

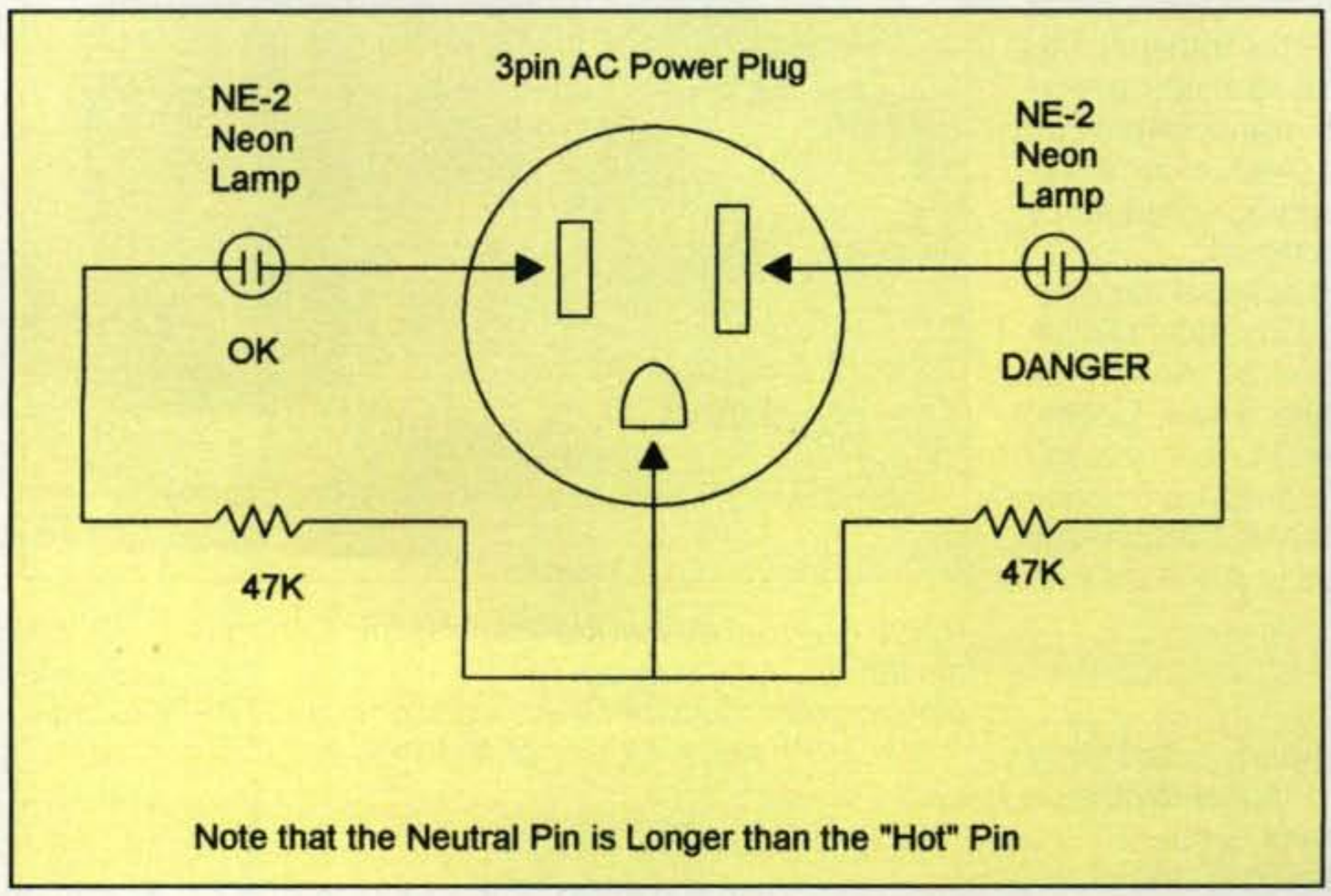

Fig. 5– A 115- or 120-VAC outlet "polarity" tester.

connected to a convenient mounting hole inside the unit. Not only was any potential hazard reduced, but I believe the receiver might actually be a bit quieter due to the extra earth ground.

Finally, *when working with AC-line-powered equipment, always exercise extreme caution.* Do not stand on wet floors, never touch connections to see if they are "live," and do not cut off ground pins. When rewiring outlets or making direct connections to the AC line, be sure that all power is turned off at the electrical panel and check with your DVM (set to the AC range) before touching anything. It is also a very good idea to use the old electrician's trick of keeping one hand in your pocket if you must absolutely work directly on a "hot" AC line. This will greatly reduce the chance of creating the "wrong" type of circuit, as mentioned above. On a selfish note, I want all of you to be around to read the various "gems" I come up with, so play it safe with the AC line!

73, Irwin, WA2NDM

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If you're still using a Drake TR-7 transceiver but find it difficult to operate modern digital modes due to frequency drifting, Misty Hollow Enterprises may have the solution to your problem.

CQ Reviews:

Misty Hollow Enterprises RB7500
A Direct-Digital-Synthesis VFO for the Drake TR-7

BY GORDON WEST,* WB6NOA

Fewer and fewer ham operators on the high-frequency bands find themselves using the RIT (receiver incremental tuning) feature on their radios. RIT slightly shifts the receive frequency without changing the transmit frequency. These days there is no need for that, as almost everyone is rock-solid in frequency, and most HF transceivers can tune down to 10-Hz steps off the main knob. Also, when working most digital modes (e.g., PSK-31), spotting a frequency down to 1 Hz is accomplished on a computer.

However, tie your digital-mode system to some of the classic rigs with slight drifting problems, and you immediately can understand the frustration when the cool breeze blows in on your operating station and your classic Drake, Swan, Collins, or even the Poly Comm 6/2 begins to wander. Maybe it doesn't wander enough such that someone's voice goes from basso profundo to soprano, but it is enough to make it a constant effort to keep a solid incoming digital signal in place on your computer screen.

Photo A– Front view of the Misty Hollow Enterprises RB7500 digital VFO for the Drake TR-7 transceiver. It is a "plug-and-play" replacement for Drake's discontinued RV-75 external VFO. (Photos courtesy of Misty Hollow Enterprises)

A Solution for TR-7 Owners

For Drake TR-7 owners, a Texas family company called Misty Hollow Enterprises has developed a direct-digital-synthesis external VFO which replaces the discontinued Drake RV-75 external VFO. It's a direct swap-out—just plug in and play!

"The original Drake VFO RV-75 was actually intended for use with the TR-5, which came out *after* the TR-7," explains Roger Bankston, W5IAB, co-developer, with Don Jackson, K5ATW, of the new DDS VFO. "TR-7 owners would also needed a special adapter cable with the Drake RV-75 VFO, and what we wanted to do with direct digital synthesis is completely solve the Drake's drifting problems," adds Bankston, proudly showing and demonstrating his equipment at a recent Dallas hamfest.

The RB7500 (along with a very similar RB7501; see box), Bankston's company's new product for the Drake TR-7 (as well as the commercial version, the Drake TR-4310), employs a Zilog EZ-80F91 CPU running at 50 MHz and an Analog Devices AD9851 DDS hand-soldered-in chip to deliver a high-stability replacement for the signal from the rig's internal PTO (permeability tuned oscillator, the tuning system used in the original TR-7). Bankston hand-solders each chip himself, and his work looks nearly as neat as if it came out of a machine wave soldered!

The DDS VFO uses a smooth shaft encoder with 1000 steps/revolution with selectable tuning rates of 1 kHz, 10 kHz, or 100 kHz per revolution. The tuning knob is solid cast aluminum for that professional heavy feel.

The completely assembled DDS VOX offers a large LCD display of band range, transmit frequency, receive frequency, and an indication of whether you are operating simplex or split-mode, as often is necessary when working DX on 40 meters. All bands from 160 through 10 meters are included, and the LCD shows tuning-step size.

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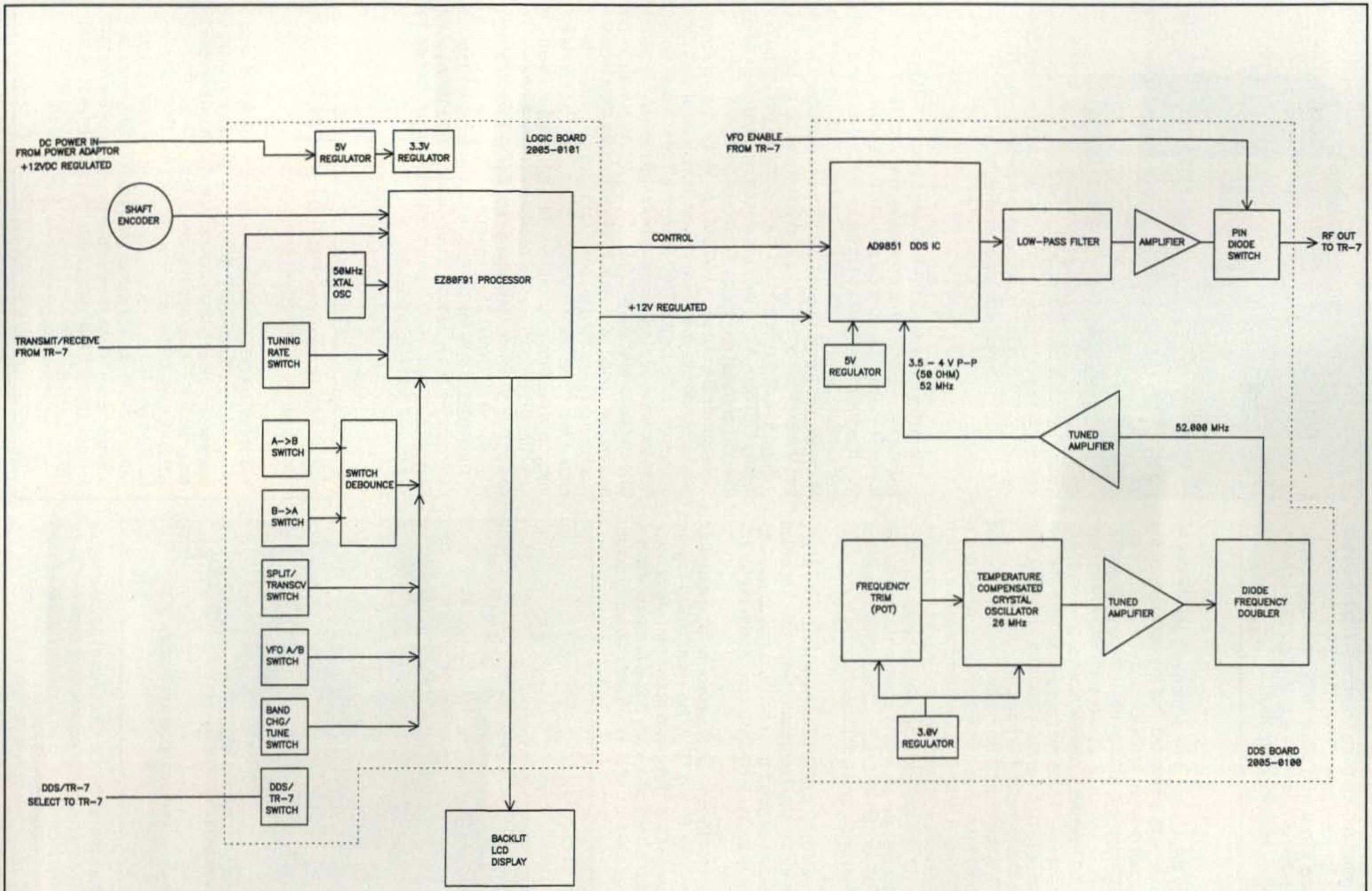

Fig. 1– Block diagram of Misty Hollow's Digital Direct Synthesis VFO for the Drake TR-7. The Zilog EZ-80F91 CPU and Analog Devices AD9851 DDS integrated circuit make up the electronic "heart" of the unit. (Courtesy of Misty Hollow Enterprises)

The frequency display has a resolution of 1 Hz. The thick instruction manual aptly points out that the accuracy of the display depends not only on the DDS temperature-compensated crystal oscillator, but also on the three crystal oscillators within the TR-7. The DDS is calibrated before shipment using an HP 5340A frequency counter that has a current NBS traceable calibration certificate, so the operator with the new DDS might first tune to 10-MHz WWV and ensure that his/her own rig is calibrated to match the frequency display.

The DDS VFO features six push-button switches. The red buttons provide internal or external frequency selection, a selection of split VFO A or VFO B, and a momentary button to transfer contents of VFO B into VFO A. The big, heavy tuning knob is used to change bands as well as select frequency. A separate tuning rate allows the operator to change frequencies in 1-, 10-, or 100-kHz steps. One additional position locks the frequency knob so you don't accidentally bump yourself off frequency.

On the rear of the RB7500 DDS VFO is a power on/off switch, plus a receptacle for 12 volts input, center pin positive. It comes with a power adapter so you won't need to come up with one yourself and risk grabbing the wrong one, as the center pin could be negative!

A single-connector 15-pin jack allows you to "plug and play" the DDS VFO to your Drake TR-7. No modification to your Drake radio is necessary. The only problem that might occur is if your TR-7 has a fixed-frequency board installed; if this is the case, you may need to remove the fixed-frequency board.

Photo B– Interior view of the RB7500. Note the neat layout and the use of ribbon cables for connections between circuit boards. Each chip is hand-soldered by Misty Hollow's Roger Bankston, W5IAB.

Photo C– The rear panel of the RB7500 has only two connections—12-volt DC power and the cable to the TR-7—along with a power switch.

The designer of this DDS VFO uses the +10T signal from the auxiliary connector to determine when the TR-7 is in the transmit mode. The load on the +10T is approximately 0.5 mA. If additional wires need to be connected as part of your installation, doing so will not necessarily void the warranty. Normally, you would plug the DB-15 connector from the cable into the back of the RB7500, and you would be all set.

Page five of the instruction manual shows the calibration for the RB7500. Along with calibration, you can also adjust the LCD contrast control on the processor board.

De'Borah Bankston, KB5OQX, of Misty Hollow Enterprises, comments that there are still hundreds of ham radio operators using Drake TR-7 equipment who would benefit from the improved frequency stability that the RB7500 offers. She explains that each DDS VFO is painstakingly hand-assembled, tuned, and tested before it leaves their facility in Carrollton, Texas. She invites *CQ* magazine readers to log onto the company's web page at <http://www.mistyhollowenterprises.com/>, or to e-mail them at <navaids@tstar.com> or <d.bankston@comcast.net>, and see all that goes into these hand-built DDS VFOs specifically designed for Drake TR-7 operators.

The RB7500 sells for $475. To order, or for more information, contact Misty Hollow Enterprises, 1509 Derby Run, Carrollton, Texas 75007; phone 214-995-9691, or see the web/e-mail addresses above.

Misty Hollow RB7501 and 7510 Wider Horizons

The RB7500 VFO reviewed in this article is designed exclusively for the Drake TR-7 transceiver and its commercial counterpart, the TR-4310. In response to customer demand, Misty Hollow Enterprises has also introduced the RB7501, which (for an additional $25) works with the TR-7/R-7 combination (the R-7 is a receiver often used for split operation with the TR-7), as well as the TR-4310/R7 combination and the later model TR-7A. Another brand-new item is the RB7510 for the Drake TR-4 transceiver. Prices: RB7501: $500, RB7510: $475.

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The CQ DX Field Award Report

BY BILLY F. WILLIAMS,* N4UF

The new CQ DX Field Award program is now a reality. The lowest certificate numbers were assigned through a drawing in early May 2005 following a 45-day window. By compensating for uneven postal delivery times, this window provided eager stations worldwide with a chance to get low numbers.

The Mixed award was the most popular, followed by SSB. Applicants did an excellent job of sorting out fields on short notice to qualify for their low certificate numbers.

Over 225 of the Earth's 324 fields were represented on about 100 application forms submitted during those 45 days. The initial surge has subsided and the *CQ* staff has been busy preparing award certificates and endorsements for charter applicants.

Award hunters who act quickly can still qualify for two-digit numbers. Some hams report that digging through their cards and sorting out the fields has given them a fresh perspective on the great pastime of amateur radio!

**Manager, CQ DX Awards, e-mail: <n4uf@cq-amateur-radio.com>*

CQ DX Field Award Honor Roll

The CQ DX Field Award Honor Roll recognizes those DXers who have submitted proof of confirmation with 175 or more grid fields. Honor Roll lisiting is automatic upon approval of an application for 175 or more grid fields. To remain on the CQ DX Field Award Honor Roll, annual updates are required. Updates must be accompanied by an SASE if confirmation is desired. The fee for endorsement stickers is $1.00 each plus SASE. Please make all checks payable to the Award Manager, Billy F. Williams. Mail all updates to P.O. Box 9673, Jacksonville, FL 32208.

Mixed

K2TQC	225	BA4DW	188	NØFW	176
VE3XN	217	F6HMJ	182	N8PR	175
HAØDU	217	K2SHZ	182	ON4CAS	175
KØDEQ	207	KØCA	181	K8OOK	175
JN3SAC	194	N4NX	181		
N4MM	194	W5ODD	177		

SSB

VE7SMP	182	W4ABW	177	N4MM	176
KØDEQ	180	NØFW	176		

CW

KØDEQ	198	KØCA	175
JN3SAC	181	N4MM	175

The CQ DX Field Award Program

Mixed

1	WD9DZV	30	K2SHZ
2	W7AV	31	W9AAZ
3	KØDEQ	32	KØDEW
4	N4MM	33	VE3XN
5	W5ODD	34	W4PGC
6	W4WX	35	HAØDU
7	HA5WA	36	K2YOF
8	W3TC	37	W2JLK
9	NØWY	38	HB9DDO
10	NI5F	39	KA5EYH
11	N5BA	40	VE3NPC
12	N8PR	41	N4UF
13	G4GED	42	JN3SAC
14	VE6ZT	43	DH5WB
15	W1JR	44	K8OOK
16	K9APW	45	W9HR
17	W4LTJ	46	K7ZYV
18	VE3CR	47	N4ABC
19	WBØWAO	48	BA4DW
20	W8PAT	49	K6RG
21	N5PU	50	WAØFQK
22	PY2DBU	51	WB4SQ
23	F6HMJ	52	N4NX
24	ON4CAS	53	W4DTA
25	NØFW	54	K2TQC
26	W2VU		
27	KD5YUK		
28	K5WTA		
29	KØCA		

SSB

1	NØFW	18	KB8UUZ
2	W4ABW	19	VE7SMP
3	W7AV	20	W1JR
4	WAØFQK	21	W4LTJ
5	KØCA	22	AE9DX
6	N4MM	23	N5BA
7	W2VU	24	M5AEX
8	KØDEQ	25	HL5AP
9	HB9DDO	26	K5CX
10	W5ODD	27	N4UF
11	W3TC	28	WA5UA
12	WD9DZV	29	JN3SAC
13	VE3CR	30	DL3DXX
14	PY2DBU	31	SV1EOS
15	NI5F	32	DH5WB
16	K8ZES/2		
17	K6IRA		

CW

1	VE3CR	13	N5FG
2	W7AV	14	W1JR
3	WD9DZV	15	KØCA
4	HB9DDO	16	NØFW
5	KG6DFM	17	N5BA
6	NI5F	18	HL5AP
7	K2SHZ	19	PY2DBU
8	KØDEQ	20	PP6CW
9	N4MM	21	JN3SAC
10	W5ODD	22	AA4FU
11	W2JLK	23	DL3DXX
12	WA2VQV	24	W9HR

Digital

1	WD9DZV	3	NI5F
2	KØDEQ	4	KØCA

Endorsements

Mixed

200	K2TQC/225	100	W7AV/105
200	VE3XN/217	100	WB4SQ/102
200	HAØDU/217	100	NØWY/100
200	KØDEQ/207	50 MHz	N4MM
175	JN3SAC/194	50 MHz	W8PAT
175	N4MM/194	50 MHz	K5WTA
175	JN3SAC/193	50 MHz	W3TC
175	BA4DW/188	50 MHz	W1JR
175	F6HMJ/182	50 MHz	K9APW
175	K2SHZ/182	50 MHz	W4LTJ
175	N4NX/181	50 MHz	K2YOF
175	KØCA/181	28 MHz	NØWY
175	ON4CAS/175	28 MHz	N4MM
175	K8OOK/175	28 MHz	W5ODD
175	N4MM/178	28 MHz	VE3CR
175	W5ODD/177	28 MHz	W4LTJ
175	NØFW/176	28 MHz	JN3SAC
175	N8PR/175	28 MHz	W9HR
150	W4PGC/164	3.5/7 MHz	N4MM
150	VE6ZT/158	3.5/7 MHz	W5ODD
100	VE3CR/125	1.8 MHz	N4MM
100	NI5F/119	QRPp	N5BA
100	W1JR/118	QRPp	N4MM
100	KA5EYH/113	OSCAR	VE3NPC
100	VE3NPC/112	OSCAR	W9HR
100	N5BA/142	Mobile	N4MM
100	VE3CR/107		

SSB

175	VE7SMP/182	50 MHz	NØFW
175	KØDEQ/181	50 MHz	DL3DXX
175	W4ABW/177	28 MHz	W2VU
175	NØFW/176	28 MHz	N4MM
175	N4MM/176	28 MHz	WAØFQK
150	N4MM/156	28 Mhz	KB8UUZ
100	K6IRA/137	28 MHz	W4LTJ
100	K5CX/128	28 MHz	VE3CR
100	W5ODD/113	28 MHz	DL3DXX
100	DL3DXX/110	28 MHz	JN3SAC
100	VE3CR/107	3.5/7 MHz	DL3DXX
50 MHz	N4MM	3.5/7 MHz	N4MM
50 MHz	W1JR	1.8 MHz	JN3SAC
50 MHz	W3TC	1.8 MHz	DL3DXX
50 MHz	W4LTJ	QRPp	N4MM

CW

175	KØDEQ/198	100	KG6DFM/101
175	JN3SAC/181	50 MHz	N4MM
175	KØCA/175	50 MHz	DL3DXX
175	N4MM/175	28 MHz	W9HR
150	K2SHZ/172	28 MHz	JN3SAC
150	KØCA/171	28 MHz	N4MM
150	N5FG/153	28 MHz	VE3CR
100	NØFW/147	28 MHz	DL3DXX
100	N4MM/147	3.5/7 MHz	N4MM
100	W5ODD/138	3.5/7 MHz	DL3DXX
100	N5FG/136	1.8 MHz	DL3DXX
100	HL5AP/117	1.8 MHz	N4MM
100	DL3DXX/109	QRPp	N4MM
100	NI5F/107	OSCAR	W9HR
100	VE3CR/103		

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Please make all checks payable to the award manager.

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SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅜ x 6 x 9	3.4
SS-18	15	18	1⅜ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅜	4.2
SS-30	25	30	3¼ x 7 x 9⅜	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅜	4.2
SS-30M*	25	30	3¼ x 7 x 9⅜	5.0

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅜	6.5
SRM-30	25	30	3½ x 19 x 9⅜	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅜	6.5
SRM-30M	25	30	3½ x 19 x 9⅜	7.0

MODEL SRM-30M-2

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MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30-2	25	30	3½ x 19 x 9⅜	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅜	11.0

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MODEL SS-10EFJ-98

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SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

CQ World-Wide DX Contest All-Time Records BY FREDERICK CAPOSSELA, K6SSS

These records represent the pinnacle of achievement by the true champions of contesting. We congratulate them on their success. Number groups after calls are: year of operation, total score, contacts, zones and countries. All-Band and Multi-Operator records include a band-by-band breakdown of the world leader in each category.

Phone Single Operator/Single Band WORLD RECORD HOLDERS

1.8	IG9/IV3TAN('96)....441,252	1,203	24	102
3.5	IG9T('95) (Opr. IV3TAN)....816,959	1,938	33	110
7.0	IG9GSF('97) (Opr. IT9GSF)....1,249,236	2517	35	137
14	PYØFM('94) (Opr. PY5CC)....3,202,242	5,109	38	175
21	ZD8Z('94) (Opr. N6TJ)....3,481,925	5,535	36	179
28	HC8A('01) (Opr. N6KT)....3,916,600	6,957	39	161

Single Operator/All Band

AF	EA8BH('99) (Opr. S53R)....15,272,745	7,204	173	622
AS	A61AJ('04) (Opr. JM1CAX)....10, 785,336	6,290	143	475
EU	GIØKOW('99)....10,457,664	6,375	155	589
NA	8P1A('04) (Opr. W2SC)....16,250,784	9,254	158	568
O	KH7R('00) (Opr. CT1BOH)....11,894,730	7,473	170	392
SA	HC8A('99) (Opr. N6KT)....18,607,050	8,638	175	595
QRP	P40W('00) (Opr. W2GD)....5,097,780	3,599	127	381
LowPwr.	D44TD('02) (Opr. IV3TAN)....11,199,793	6,097	141	508
Asst.	9Y4ZC('03) (Opr. DL6FBL)....14,979,055	8,114	137	500

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	150	13	54
EA8BH	3.5	547	18	80
(Opr. N5TJ)	7.0	682	27	97
(1999)	14.0	2,655	39	158
25,646,796	21.0	2,071	39	148
	28.0	4,148	40	155
	Total	10,253	176	692

Multi-Operator/Single Xmtr.

AF	D44TC('01)....22,978,944	9,638	178	694
AS	P3A('03)....20,196,420	9,210	167	656
EU	IQ4A('90)....17,255,700	7,253	183	717
NA	VP2E('03)....25,299,296	11,617	182	720
O	KHØAA('02)....12,599,064	6,872	158	490
SA	PJ1B('93)....22,596,570	9,386	164	646

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	128	13	47
VP2E	3.5	414	24	88
(2003)	7.0	1,162	32	130
25,299,296	14.0	2,763	39	147
	21.0	2,990	39	151
	28.0	4,160	35	157
	Total	11,617	182	720

Multi-Operator/Two Xmtr.

AF	IH9P('03)....29,447,379	11,831	171	688
AS	RT9W ('04)....11,399,373	5,453	162	661
EU	IR4X('04)....18,385,620	8,626	185	754
NA	VP2E('04)....40,907,104	16,868	188	804
O	KHØAA('03)....14,109,480	7,589	172	488
SA	PJ2T('02)....28,415,835	12,916	161	628

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	216	17	62
VP2E	3.5	945	23	102
(2004)	7.0	2,346	34	145
40,907,104	14.0	3,794	40	172
	21.0	4,771	39	163
	28.0	4,796	35	160
	Total	16,868	188	804

Multi-Operator/Multi-Xmtr.

AF	CN8WW('00)....78,170,508	25,711	199	854
AS	A61AJ('02)....33,377,700	13,376	186	784
EU	M6T('99)....29,338,624	14,655	188	836
NA	VP2E('01)....44,332,785	19,214	185	760
O	KHØAM('90)....35,730,600	16,309	179	565
SA	PJ4B('99)....59,127,810	20,618	188	834

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	923	17	77
CN8WW	3.5	1,818	25	106
(2000)	7.0	3,545	37	138
78,170,508	14.0	6,737	40	177
	21.0	5,754	40	175
	28.0	6,934	40	181
	Total	25,711	199	854

CW Single Operator/Single Band WORLD RECORD HOLDERS

1.8	IH9U('04) (Opr. IN3QBR)....274,032	1,127	16	72
3.5	EA8EA('96) (Opr. OH2KI)....1,175,550	2,672	36	114
7.0	EA8EA('03) (Opr. OH2MM)....1,877,050	3,660	38	137
14	CN2KM('04) (Opr. SM2EKM)....2,023,740	3,899	38	142
21	ZD8Z('97) (Opr. N6TJ)....2,357,967	4,589	39	140
28	ZX5J('99) (Opr. N6TJ)....2,131,942	3,962	39	152

Single Operator/All Band

AF	EA8BH('00) (Opr. N5TJ)....18,010,765	7,555	183	634
AS	A45XR('03)....10,837,434	5,886	161	520
EU	CT8T('03) (Opr. OH1NOA)....7,613,600	5,969	142	478
NA	KP3Z('03) (Opr. N5TJ)....11,440,230	6,675	174	536
O	KH7X('03)....7,673,314	5,256	170	347
SA	P40E('03) (Opr. CT1BOH)....15,943,070	7,828	169	546
QRP	P40W('99) (Opr. W2GD)....5,024,800	3,277	137	413
Low Pwr.	P40W('01) (Opr. W2GD)....10,198,792	5,723	151	475
Asst.	9Y4ZC('04) (Opr. DL6FBL)....14,581,665	6,576	169	596

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	197	17	60
EA8BH	3.5	541	20	82
(Opr. N5TJ)	7.0	1,091	33	95
(2000)	14.0	1,601	39	129
18,010,765	21.0	1,746	39	134
	28.0	2,375	35	133
	Total	7,555	183	634

Multi-Operator/Single Xmtr.

AF	TS7N('00)....13,140,050	6,348	156	614
AS	P3A('02)....19,470,528	8,432	176	702
EU	RU1A('00)....12,753,600	5,670	203	757
NA	8P9Z('99)....18,711,252	8,245	192	669
O	AH2R('04)....10,283,200	5,279	188	512
SA	HC8N('95)....14,302,820	7,252	162	503

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	264	13	61
P3A	3.5	1,121	27	98
(1999)	7.0	1,535	35	121
19,243,476	14.0	1,825	39	136
	21.0	1,782	39	136
	28.0	1,761	38	139
	Total	8,288	191	691

Multi-Operator/Two Xmtr.

AF	CT9L('03)....24,874,181	10,942	175	636
AS	A61AJ('02)....24,384,292	10,505	194	704
EU	RU1A('03)....16,533,164	8,314	209	749
NA	VE3EJ('03)....14,545,882	7,457	184	622
O	AH2R('02)....11,311,266	6,390	171	482
SA	HC8N('04)....30,971,500	12,429	196	679

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	276	14	39
HC8N	3.5	1,114	28	94
(2004)	7.0	2,552	38	131
30,971,500	14.0	2,224	40	140
	21.0	2,493	39	143
	28.0	1,902	37	132
	Total	12,429	196	679

Multi-Operator/Multi-Xmtr.

AF	CN8WW('99)....70,713,270	23,068	219	843
AS	A61AJ('99)....38,789,751	15,812	213	788
EU	OH2U('99)....22,244,067	10,956	211	786
NA	6Y2A('98)....39,279,140	17,609	192	740
O	KHØAM('92)....23,951,385	11,253	190	527
SA	PJ4B('99)....47,516,600	17,889	208	757

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	1,694	24	100
CN8WW	3.5	3,248	35	121
(1999)	7.0	4,358	40	141
70,713,270	14.0	4,837	40	159
	21.0	4,319	40	161
	28.0	4,612	40	161
	Total	23,068	219	843

Visit Our Web Site

CQ World-Wide DX Contest All-Time U.S.A. Records BY FREDERICK CAPOSSELA, K6SSS

Tabulated below are the record-high scores achieved by U.S. contesters in the CQ World-Wide DX Contest. Number groups following calls and bands are: year of operation, total score, contacts, zones, and countries.

PHONE

Single Operator/Single Band

1.8	K1ZM('95)	55,420	215	15	70
3.5	K1ZM/2('96)	292,100	952	27	100
7.0	KC7EM('95)	409,446	1,083	34	95
14	K1OX('85) (Opr. KC1F)	1,131,328	2,176	36	140
21	KQ2M/1('99)	1,327,139	2,624	39	148
28	W4ZV('01)	1,464,255	2,654	40	155

Single Operator/All Band

Station	Band	QSOs	Zones	Countries
	1.8	21	8	15
K1AR	3.5	154	16	59
(1999)	7.0	231	29	84
7,898,499	14.0	1,145	38	142
	21.0	1,150	36	123
	28.0	1,393	33	128
	Total	4,094	160	551

QRP

KR2Q('00)	1,507,506	1,181	104	358

Low Power

K1ZM/2('00)	3,368,010	1,907	151	504

Assisted

KI1G('01)	8,053,315	3,768	168	617

Multi-Operator/Single Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	32	12	30
K1AR	3.5	197	18	76
(1990)	7.0	154	26	95
11,193,606	14.0	1,370	39	167
	21.0	1,167	38	165
	28.0	1,517	37	170
	Total	4,437	170	703

Multi-Operator/Two Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	56	14	40
K3LR	3.5	439	27	89
(2004)	7.0	830	33	122
18,382,950	14.0	2,024	40	169
	21.0	2,899	40	166
	28.0	1,390	33	145
	Total	7,638	187	731

Multi-Operator/Multi-Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	197	16	36
KC1XX	3.5	699	24	102
(1999)	7.0	746	31	119
25,963,386	14.0	2,711	40	185
	21.0	3,245	40	170
	28.0	2,596	36	170
	Total	10,194	187	782

CW

Single Operator/Single Band

1.8	K1ZM('95)	142,358	470	23	83
3.5	W1MK('00)	417,240	1,273	26	96
7.0	K1ZM('90)	839,520	1,783	34	125
14	K2WK('98)	1,007,781	1,955	39	144
21	K2SS/1('00)	974,440	2,035	36	134
28	W4ZV('00)	965,874	1,984	37	137

Single Operator/All Band

Station	Band	QSOs	Zones	Countries
	1.8	104	14	40
K5ZD/1	3.5	384	19	73
(2000)	7.0	971	29	103
8,756,568	14.0	988	33	105
	21.0	848	33	104
	28.0	1,189	33	106
	Total	4,484	161	531

QRP

K3OO('00)	1,731,450	1,299	114	371

Low Power

K1TO/4('02)	4,141,188	2,276	140	526

Assisted

K3WW('00)	8,465,815	4,091	166	589

Multi-Operator/Single Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	49	13	46
K1AR	3.5	569	27	101
(1998)	7.0	1,384	35	136
12,063,114	14.0	991	38	151
	21.0	999	36	135
	28.0	1083	32	132
	Total	5,074	181	701

Multi-Operator/Two Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	79	18	56
K4JA	3.5	625	21	105
(2002)	7.0	1,480	36	133
14,084,994	14.0	911	38	146
	21.0	1,568	35	144
	28.0	1,085	34	137
	Total	5,748	182	721

Multi-Operator/Multi-Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	291	23	63
KC1XX	3.5	1,040	34	116
(1999)	7.0	2,119	40	138
24,602,524	14.0	2,155	40	155
	21.0	2,028	38	150
	28.0	1,947	38	148
	Total	9,580	213	770

Club Record: Yankee Clipper Contest Club ('99) 702,296,971
Team Contesting: Phone – Neiger's Tigers Team #1 ('99) 66,546,582
CW – Neiger's Tigers Team #1 ('03) 56,282,996

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What You've Told Us...

Our August survey asked about your attendance at hamfests (for those of you who keep track, we had a little mixup and missed July; we'll have the results of that survey next time). A whopping 96% of the readers who responded to the survey have been to at least one hamfest, and 75% have been to one within the past year. Only 8% have not been to a hamfest in more than five years.

Your most popular reason for going to a hamfest is to shop for bargains in the flea market (42%), followed by seeing and learning about new gear (37%) and socializing with other hams (also 37%). Next was attending forums (22%), followed by buying something after looking over the available options (18%), buying something you've already decided on (13%), selling used gear at the flea market (10%), a reason we didn't list (6%), and for the masochists among us—to eat hamfest food (2%)!

The greatest number of you (46%) say you attend about the same number of hamfests today as you did five years ago, while 21% of you attend hamfests more frequently than you did five years ago and 29% attend less frequently. Among those who go to fewer hamfests, the greatest number (20%) say it's mainly because there are fewer hamfests in their area; 18% say they've cut back because there's less good stuff in the flea markets, 14% say they have less time and/or more obligations, 13% cite age/mobility related problems, 12% have a reason we didn't list, 9% say they just have less interest, and 7% each say there are fewer dealers selling new gear and that they can get better deals online or over the phone.

We thank those of you who submitted ideas for improving hamfests and hamfest attendance, and we'll be reviewing them. This month's free subscription winner is Richard Bruno, N6ISY, of Fountain Valley, CA.

Reader Survey
October 2005

We'd like to know more about you—about who you are, where you live, what kind(s) of work you do, and of course, what kinds of amateur radio activities you enjoy. Why? To help us serve you better.

Each time we run one of these surveys, we'll ask a few different questions and ask you to indicate your answers by circling numbers on the Survey Card and returning it to us. As a bit of an incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

This month, since the FCC has proposed doing away with all Morse code testing, we want to find out about your CW (Morse code) operating habits and whether you would have learned the code if you didn't have to in order to pass a license exam. Yes, we asked these same questions just over a year ago. We want to see if anything has changed..

Please answer by circling the appropriate numbers on the reply card.

1. How would you classify your proficiency level as a CW operator (choose only one)?

Expert 33
Advanced 34
Intermediate 35
Beginner 36
Don't know Morse code 37

2. What is your level of CW activity versus other modes?

I operate CW exclusively 38
I operate CW most of the time 39
I operate CW about half of my on-air time 40
I operate CW once in a while 41
I rarely operate CW 42
I never operate CW 43

3. Please circle the numbers for on-the-air activities in which you operate CW *a majority of the time* (left-hand column) and *some of the time* (right-hand column):

Contesting	12	44
HF DXing	13	45
Traffic Handling	14	46
Rag-chewing	15	47
VHF DXing	16	48
Other	17	49
None	18	50

4. What is your *primary* reason for operating CW?

Enjoyment of the mode 51
Its simplicity and efficiency 52
CW operators are better behaved 53
Its ability to get through in marginal conditions 54
Other 55
Don't operate CW 56

5. Do you think you would have learned CW if it was not a licensing/upgrading requirement?

Yes 57
No 58
Don't know 59
Have not learned CW 60

Thank you very much for your replies. We'll be back with more questions.

Extremely Xcellent

DM-330 MVT
Communications Grade Switching Power Supply

This "breakthrough" switching power supply packs a lot of features into a compact, lightweight design that features 5 ~ 15 VDC variable output and delivers up to 30 amps continuous, 32 amps peak. Unlike some other "switchers" it's electrically quiet. But if you should find noise, the patented Noise Offset Circuit™ lets you move any noise you might find to another frequency. Other features include a large illuminated Volt/Amp meter, rear panel binding posts (32 A), front panel cigar outlet (10 A), two sets of snap-in terminals (5 A each), front panel voltage adjust, customer-defined output "memory", ripple less than 15mV p-p and triple circuit protection for short circuit, over temperature, and current limiting.

EDX-2 Automatic Wire Antenna Tuner

Tunes 160 ~ 10 meters (amateur bands) in seconds and mates with DX-70 or DX-77 HF transceivers. Can be mounted outdoors and used for base/mobile.

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Cigar Plug Cable with filter

EMS-47
Mic for Handhelds

EMS-14
Desk Mic

ESC-36
Soft Case for DJ-196 series

EDH-29
Drycell for DJ-V5TH

EDC-91
Rapid Charger for DJ-V5TH

EJ-47U
Digital Board for DR-620

EJ-50U
TNC Board for DR-620

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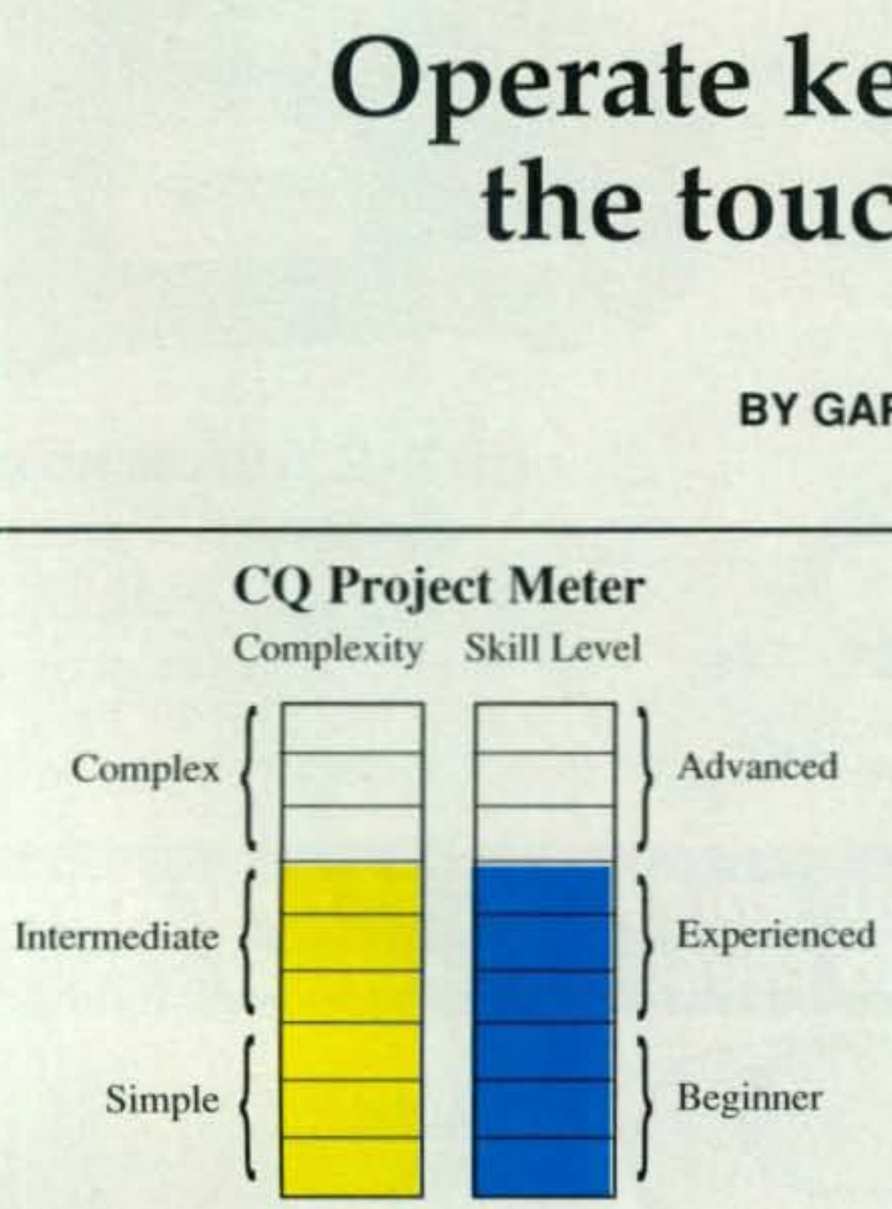
The growing popularity of portable HF operating has left those who prefer sending code from a keyboard with a problem—finding a keyboard that's as portable as the radio!

A Miniature, Portable CW Keyboard

Operate keyboard CW via the touch of a pencil

BY GARY S. KATH,* N2OT

CQ Project Meter



Introducing the *CQ* Project Meter

The *CQ* Project Meter is a snapshot indicator of the editors' view of how complex a project is, and the suggested skill level of the builder. It is intended only as a rough guide and is thoroughly subjective. For example, we feel that for this project, the use of surface mount components makes it of intermediate complexity, and the availability of pre-etched circuit boards makes it suitable for an experienced builder. Please let us know if you find the *CQ* Project Meter to be helpful (even if you disagree with our specific classifications). —*W2VU*

Various keying methods have been devised to enable an operator to send Morse Code. Early on in my ham radio career, I started out with an old, trusty manually operated straight key. As my speed increased, I progressed to a Vibroplex bug that provided automatic dot creation and manual dash generation. I never really perfected the coordination needed to send smooth CW with the bug. Then I purchased an electronic keyer and paddle. The electronic keyer provided a method to send both automatic dots and dashes, but sending smooth, error-free fast CW was still a challenge for me. Next came the computer revolution and software to send Morse Code using a computer keyboard. This provided a method of sending perfect code very fast.

One disadvantage of the straight key, bug, and electronic keyer is that you have to move your hand away from the key while writing down received characters. Since I send and receive code with my right hand, this requires continuous movement between the keyer paddle and my pencil during break-in CW operation.

In the case of the keyboard CW, I run a simple text editor in a window below the keyboard software window. In this fashion, I can type the received and transmit characters using the same computer keyboard. Although this works the best in terms of sending and receiving fast CW, it still requires lugging a computer/keyboard or laptop when operating portable. Also, after sitting all day in front of a computer at work, I have little desire to operate CW via a computer keyboard.

Thus, I set out to design a miniature, portable CW keyboard that goes the other way—employing the pencil used to write down incoming code as the method of touching the keys on the miniature keyboard when sending CW. This is possible because the graphite typically used as pencil "lead" is conductive.

How to Make A Miniature Keyboard

My first challenge was how to make a low-cost miniature keyboard that could be operated via a touch from a pencil point. One idea was a printed circuit board (PCB) with pads for each keyboard character wired to digital inputs of a microcontroller. A ground wire would be attached to the conductive lead of a pencil. When the pencil tip touched a junction representing a keyboard character, the junction would be grounded, causing a logic *low* that enabled the microcontroller to sense which keyboard character was touched. The disadvantage of this method is over 50 digital inputs to a microcontroller are necessary to map to all the characters on a keyboard.

*2671 Sky Top Drive, Scotch Plains, NJ 07076
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Ameritron ALS-600 *Solid State FET* compact desktop station amplifier is only 4 dB below 1500 Watts -- less than an S-unit!

There are no tubes, no tube heat, no tuning, no worry rugged -- just turn on, select band and operate. 600 Watts PEP/500W CW -- lets you talk to anyone you can hear!

Covers 1.5-22 MHz, (10/12 Meters with $29.95 kit, requires FCC license), instant bandswitching, SWR/thermal protected, extremely quiet, lighted peak reading Cross-Needle SWR/Wattmeter, front panel ALC control, operate/standby switch. 12.5 lbs., 9½Wx7¼Hx12D in.

Includes ALS-600PS transformer AC power supply for 120/220 VAC, inrush current protected. 32 lbs., 9½Wx6Hx12D inches.

ALS-600 Amp with Switching Power Supply
***New!* ALS-600S, $1428.** ALS-600 amplifier with 10 lb. ALS-600SPS switching power supply combo.

Switching Power Supply

ALS-600SPS **$629** suggested retail

Works with all ALS-600 amplifiers. Extremely lightweight, just 10 lbs. Superb regulation, very low radiated noise. 9Wx6Hx14½D in.

From QST Magazine, March, 2005

". . . the ampifier faulted only when it was supposed to. It protected itself from our boneheaded, sleep-deprived band changing manuevers . . . "

"I found myself not worrying about damaging this amplifier. It seems quite capable of looking out for itself. . . . Kudos to Ameritron."

"I couldn't hear any noise at all from the SPS (*switching power supply*) on the vertical or quad…"

"I came to greatly appreciate the size, weight, reliability and simplicity of this amplifier."

"The ALS-600S makes it possible to pack a transceiver and a 600 Watt amplifier, that together weigh less than 30 pounds."

AMERITRON *mobile* 500 Watt *no tune* Solid State Amp

Instant bandswitching, no tuning, no warm-up, SWR protected, 1.5-22 MHz, quiet, compact

ALS-500M **$849** Suggested Retail

Ameritron's ALS-500M solid state *mobile* amp gives you 500 Watts PEP SSB or 400 Watts CW output! Just turn on and operate -- no warm-up, no tuning, instant bandswitching. Fits in very small spaces.

New ALS-500RC, $49 *Remote Head* lets you mount ALS-500M amplifier *anywhere* and gives you full control. Select desired band, turn On/Off and monitor current draw on its DC Current Meter. Has power, transmit and overload LEDs. RJ-45 cables plug into Amplifier/Remote Head.

Covers 1.5-22 MHz, (10/12 Meters with $29.95 kit, requires FCC license).

Virtually indestructible! *Load Fault Protection* eliminates amplifier damage due to operator error, antenna hitting tree branches, 18-wheeler passing by. *Thermal Overload Protection* disables/bypasses amp if temperature is excessively high. Auto resets.

Typically 60-70 watts in gives full output. ON/OFF switch bypasses amplifier for "barefoot" operation. Extremely quiet fan comes on as needed. Excellent harmonic suppression, push-pull output, DC current meter. 13 VDC/80 Amps. 3½x9x15 in. 7 lbs.

ALS-500M, $849, 500 Watt mobile amp.
ALS-500MR, $879, ALS-500M/Remote Head
ALS-500RC, $49, Remote head for ALS-500M (for serial # above 13049).
ARF-500K, $179.95, Remote kit for ALS-500M serial # lower than 13049. Includes AL-500RC Remote Head, filter/relay board for ALS-500M, cables, hardware, instructions.

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Protects rig from damage by keying line transients and makes hook-up to your rig easy!

RCS-4 Remote Coax Switch . . . $139

Use 1 coax for **4** antennas. No control cable needed. SWR <1.25, 1.5 - 60 MHz. Useable to 100 MHz.

RCS-8V Remote Coax Switch. . . $149

Replace **5** coax with 1! 1.2 SWR at 250 MHz. Useable to 450 MHz.<.1 dB loss, 1kW@ 150MHz.

RCS-10 Remote Coax Switch. . . $159

Replace **8** coax with 1! SWR<1.3 to 60 MHz.**RCS-10L, $199.95** with lightning arrestors.

New! RCS-12C Fully Automatic Remote Coax Switch Controller… $229

Band data from transceiver auto selects antennas. Antenna memories. No hotswitching. Rig-to-amp interface. For 3/4 BCD, 1 of 8 relay boxes. **RCS-12, $299**, auto controller with 8 coax relay box, to 60 MHz. **RCS-12L, $339**, with lightning arrestors.

AWM-30 Precision SWR Wattmeter..$149.95

Active circuit gives *true* peak/average readings on lighted cross-needle meter.3000/ 300 Watt ranges, Remote sensor.

AWM-35 Flat Mobile SWR Wattmeter . . $159.95

1⅜ in. thin on dashboard. Remote sensor, 25' cable. True *peak*, Cross-Needle,1.5 kW, 1.8-30 MHz. *High-SWR* LED.

ATP-100 Tuning Pulser . . . $49.95

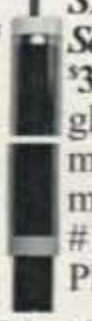
Safely tune up for full power, best linearity. Prevents overheating, tube damage, power supply stress, component failure.

ADL-1500 Dummy Load with oil . . . $69.95

Oil-cooled. 50 Ohms. 1500 Watts/5 minutes. SWR< 1.2 to 30 MHz. Low SWR to 400 MHz.

ADL-2500 fan-cooled Dry Dummy Load, $199.95

Whisper quiet fan, 2.5kW/1 minute on, ten off. 300W continuous. SWR< 1.25 to 30 MHz.<1.4 to 60 MHz.

SDA-100 Mobile Screwdriver Antenna

$359.95 80-10M, fiberglass form, Pittman motor, CNC parts, magnetic sensors, #14 wire, 1.2 kW PEP. 6' whip, $24.95

800 Watts . . . $799
with four 811A tubes

AL-811H, $799. Plugs into 120 VAC outlet. All HF bands. Hi-silicon transformer, heavy duty tank coils, tuned input, operate/standby switch, Xmit LED, ALC, lighted meters, 32 lbs. 13¾Wx8Hx16D in.
AL-811, $649. Like AL-811H, but three 811A, 600 W.

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AL-1500, $3045. Ameritron's *most powerful* amplifier uses the herculean *Eimac®* 3CX1500/8877 *ceramic* tube. 65 Watts drive gives you full output power -- and it's just loafing because the power supply is capable of 2500 Watts pep. All HF bands, all modes. 77 lbs.17Wx10Hx18½D inches.

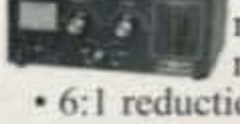
1500 Watt* True Legal Limit™ *Antenna Tuner

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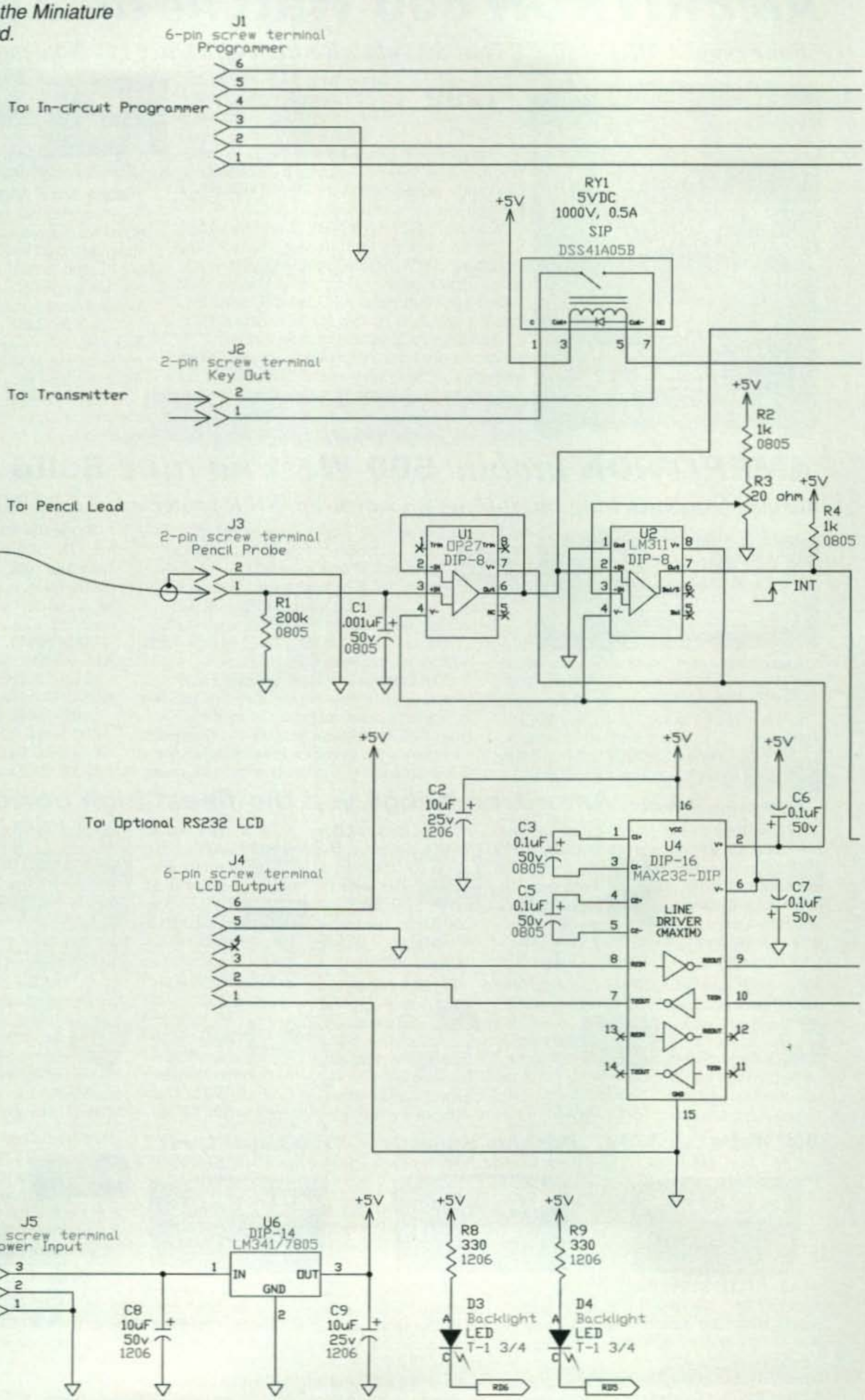
Fig. 1– Schematic for the Miniature Portable CW Keyboard.



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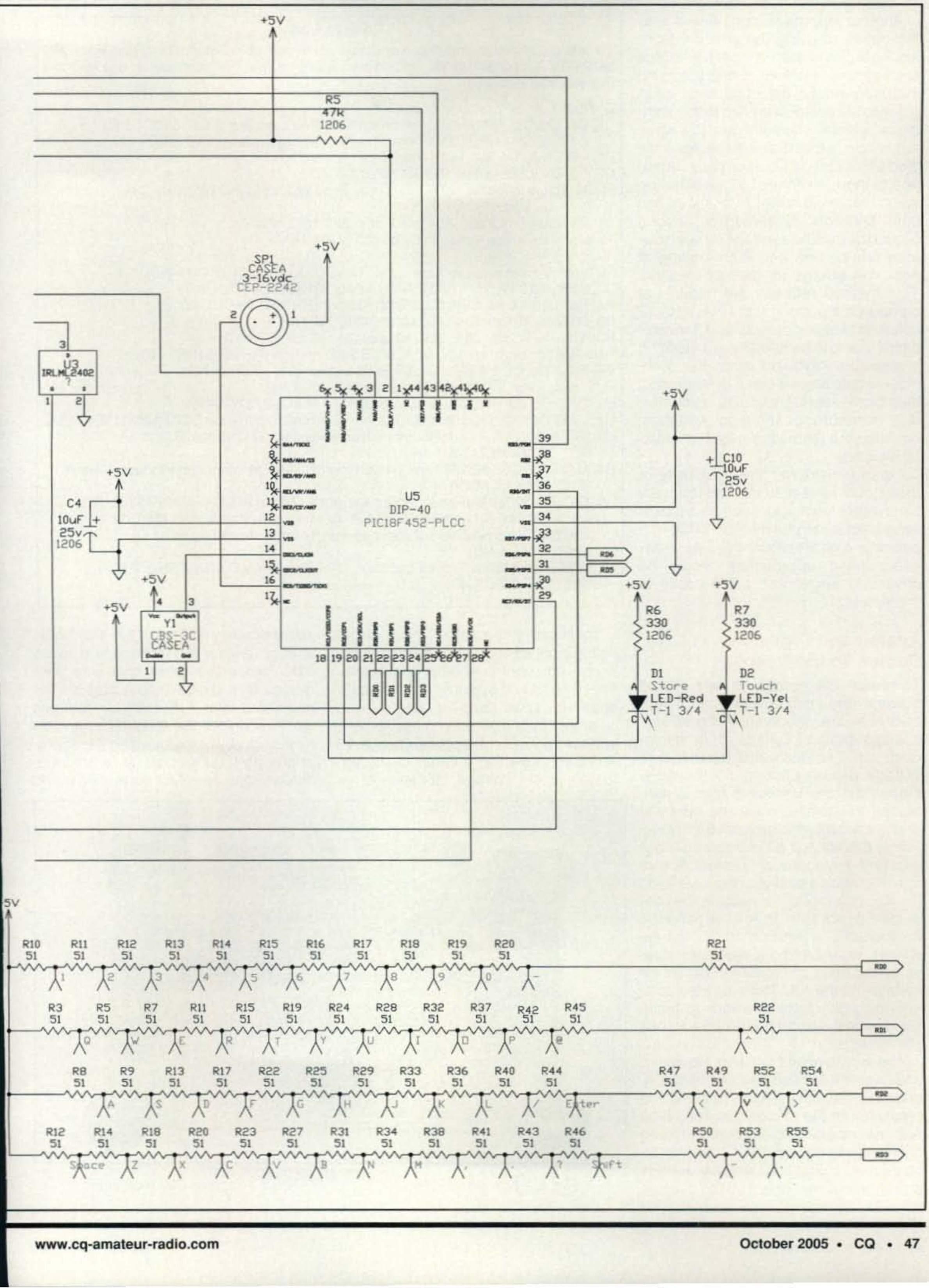
+5V
R5
47k
1206
SP1
CASEA
3-16vdc
CEP-2242
U3
IRLML2402
C4
10uF
25v
1206
Y1
CBS-3C
CASEA
U5
DIP-40
PIC18F452-PLCC
C10
10uF
25v
1206
R6
330
1206
R7
330
1206
D1
Store
LED-Red
T-1 3/4
D2
Touch
LED-Yel
T-1 3/4
R24
R25
RD0
RD1
RD2
RD3
R10 51
R11 51
R12 51
R13 51
R14 51
R15 51
R16 51
R17 51
R18 51
R19 51
R20 51
R21 51
R3 51
R5 51
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R52 51
R54 51
R12 51
R14 51
R18 51
R20 51
R23 51
R27 51
R31 51
R34 51
R38 51
R41 51
R43 51
R46 51
R50 51
R53 51
R55 51
Space
Shft
Enter

Another approach considered was the option of using the circuitry techniques implemented in most keyboards and keypads where electronic scanning methods reduce the number of wires going to the microcontroller. In this technique, a matrix of column and row wires are connected at their intersections via diode-isolated N.O. (normally open) pushbutton switches. A pushbutton switch connects between a unique column and row. Scanning is accomplished by placing a voltage on each column one-by-one and then looking at each row of keys for the key pressed. This method reduces the number of computer input/outputs (I/Os) to 12 columns of digital outputs and 4 rows of digital inputs to handle 48 keys. Building a miniature keyboard using this technique would require either developing a membrane keyboard or utilizing numerous miniature pushbutton switches, because the technique requires isolated switches.

I also considered the possibility of using more advanced methods to make a miniature keyboard, such as a touch-screen liquid-crystal display (LCD) or a personal digital assistant (PDA). However, these approaches would be physically larger and more costly to implement.

Parts List

Parts are available from Digi-Key Corp., 701 Brooks Ave South, Thief River Falls, MN 56701-0677, 800-344-4539; <http://www.digi-key.com>. Part numbers in brackets are Digi-Key part numbers.

C1: 0.001 µF, 50V ceramic capacitor
C3, C5, C6, C7: 0.1 µF, 50 V ceramic 0805 SMD capacitor (PCC1840CT-ND)
C2, C4, C8, C9 - 10 µF, 25 V ceramic 1206 SMD capacitor (PCC2326CT-ND)
D1: LED, red, T-1 3/4 (160-1498-ND)
D2, D3, D4: LED, yellow, T-1 3/4 (MV8305-ND)
J1, J4: screw terminals, 2.54 mm 3 pos, 2 used/ea. to form 6-pin screw jack (277-1274-ND)
J2, J3: screw terminals, 2.54 mm 2 pos (277-1273-ND)
J5: screw terminals, 2.54 mm 3 pos (277-1274-ND)

SP1: piezo ceramic audio transducer, 12 VDC, 13.7 mm (102-1115-ND)
R1: 200k, 1/10 W, 0.5% 0805 SMD resistor (RR12P200KDCT-ND)
R2, R4; 1k, 1/10 W, 0.5% 0805 SMD resistor (RR12P1.0KDCT-ND)
R3: 20 ohm, 25T trim potentiometer (490-2282-ND)
R5: 47k, 1/4 W, 1% 1206 SMD resistor (311-47.0KFCT-ND)
R10–R55: 51 ohm, 1/10 W, 0.5% 0805 SMD resistor (RR12Q51DCT-ND)
R6–R9: 330ohm, 1/4 W, 1% 1206 SMD resistor (311-330FCT-ND)
RY1: reed relay, 5 VDC coil with diode (420-1022-ND)
U1: OP27GS op-amp, Analog Devices, 8-pin SOIC (OP27GS-ND)
U2: LM311M voltage comparator, National Semiconductor, 8-pin SOIC (LM311MNS-ND).
U3: IRLML2402TR HEX/MOS, International Rectifier, N-Channel, 20V, 1.2A, SOT-23 (IRLML2402CT-ND)
U4: MAX232ACSE RS232 level converter/driver, Maxim Integrated Products, 16-pin SOIC (MAX232ACSE-ND)
U5: PIC18F452 flash microcontroller, Microchip, 44-pin PLCC (PIC18F452-I/L-ND)
Socket: A-CCS44-Z 44-pin PLCC socket, Assmann Electronics, Inc. (AE7328-ND)
U6: UA7805CKCS positive voltage regulator, Texas Instruments, 5V, 1.5A, TO-220 (296-13996-5-ND)
Y1: CB3-3C-20M0000-T clock oscillator, CTS-Frequency Controls, 20.000 MHz, SMD (CTX273CT-ND)

Analog and Digital I/O Comes To the Rescue

To reduce the number of wires going between the keyboard and the microcontroller, I developed a keyboard with a single analog interface to the microcontroller. The idea was to make a large voltage divider utilizing 50 resistors. One end of the voltage divider is connected to +5volts, while the opposite end is connected to ground. Each junction of the voltage divider represents a different keyboard character. A wire from the analog-to-digital input (A/D) on the microcontroller connects to the conductive pencil lead. When the pencil tip is touched to a junction on the voltage divider, representing a keyboard character, the microcontroller measures the voltage via the A/D, looks up the corresponding character in a lookup table, and sends the appropriate Morse Code character.

The prototype did function. However, it was prone to false key identification, because the design was pushing the resolution of the microcontroller's 8-bit A/D, especially with voltage variation due to key-bounce noise. Character-to-character voltage difference in this arrangement was only 100 mV.

To improve the reliability, a larger voltage difference was necessary between adjacent keyboard characters. This was solved by configuring digitally scanned rows and analog-sensed columns. Each row was comprised of a voltage divider of approximately 13 resistors, providing a larger character-to-character voltage difference of approximately 400 mV. One side of the voltage divider was connected to +5 VDC, while the other side was connected to a digital output port on the microcontroller. Software routines would scan for the touched character row by row by first grounding the appropriate port connected to a voltage-divider row. The A/D converter would

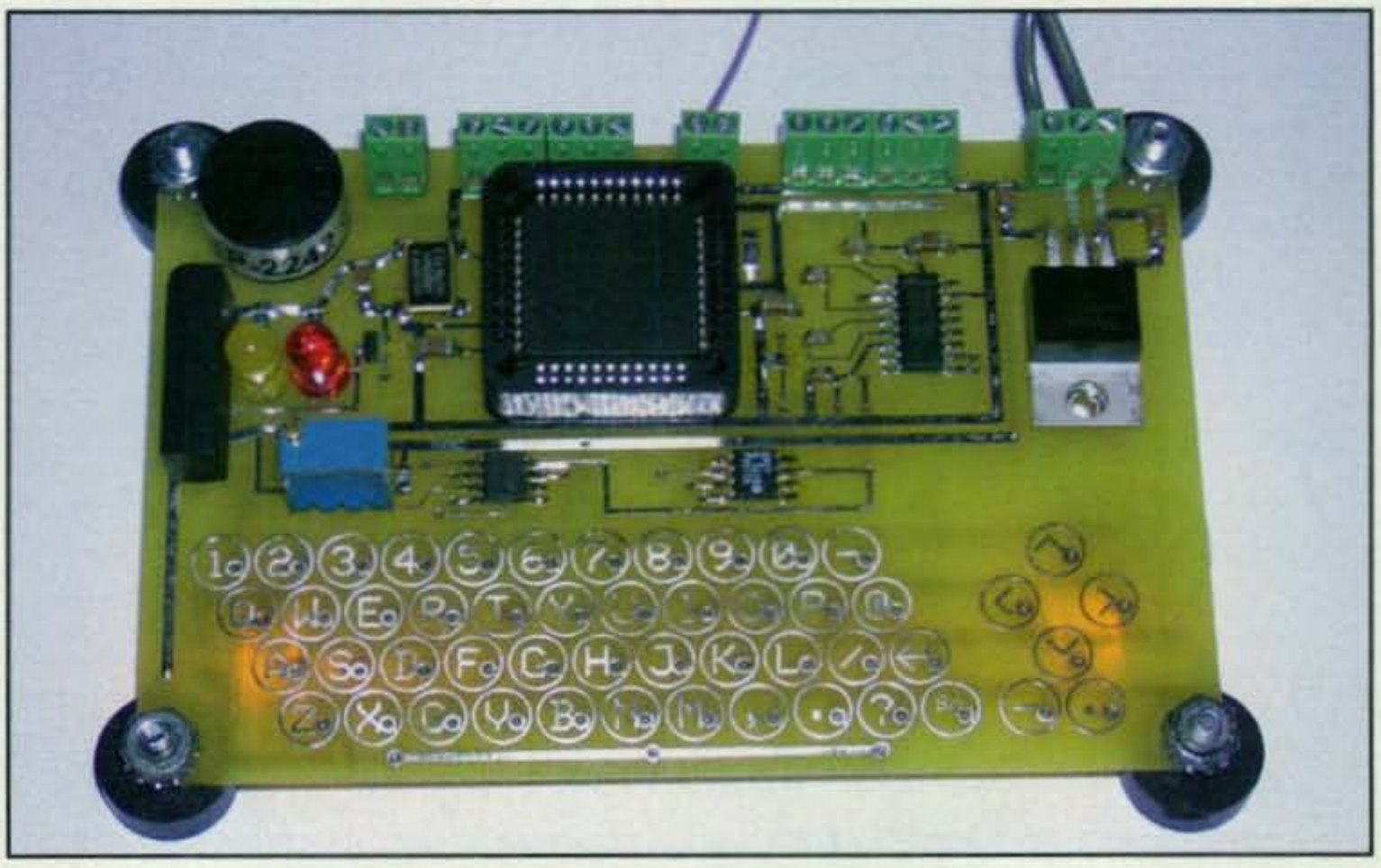

Fig. 2– Top side of the 3.8" × 2.5" Miniature Portable CW Keyboard.

then measure the voltage. If the voltage was +5 VDC or zero, the routine would move to the next row until an appropriate voltage was observed due to the connected pencil point on the active row. The measured voltage corresponded to a keyboard character on the active row.

Now for the Rest of the Circuit

To simplify the design, a single chip microcontroller with an internal A/D converter was selected for the project. A Microchip Technology, Inc. <http://www.microchip.com> PIC 18F452 microcontroller fit the bill with 27 input/output (I/O) pins, 8 pins configurable as 10-bit A/D inputs, 32K Flash memory, 1536 bytes of RAM, and 256 bytes of EEPROM. Fig. 1 shows the schematic diagram of the Miniature Portable CW Keyboard with the PIC 18F452, U5, at the controls.

The keyboard is configured as four rows of voltage dividers made up of 51-ohm resistors, R10–R55, with each resistor junction representing a different keyboard character. One end of the voltage dividers connects to +5 V, while the opposite ends of the four voltage dividers connect to Port-D, bits RD0–RD3, on the microcontroller.

A wire attached to the pencil lead acts as the voltage-measuring probe and connects to the input of a unity-gain non-inverting op-amp, U1. The Analog Devices, Inc. <http://www.analog.com> OP-27 op-amp presents a high-input impedance for the pencil-point voltage sensing tip that reduces loading of the voltage divider. C1 and R1, across the input of the op-amp, help reduce keybounce transients and noise. The output of the op-amp is connected to one of the microcontroller's A/D inputs, port RA0/AN0.

The buffered analog signal is also directed to the input of a voltage comparator, U2. The National Semiconductor Corp. <http://www.national.com> LM311 voltage comparator has a voltage trip point set by R2 and R3. When a voltage greater than 100 mV is applied to the pencil point, the comparator changes state and applies a logic HIGH to the hardware interrupt input of the microcontroller, port PB0/INT0. The purpose of the comparator is to generate an interrupt to the microcontroller when the pencil point is touched to a keyboard character. This hardware arrangement reduces software overhead by allowing the microcontroller to monitor only the interrupt pin rather than continuously scanning the entire keyboard when waiting for a character.

Relay RY1 and MOSFET driver U3 provide isolated keying of the transmitter via digital I/O port RC3. This enables the keyboard circuit to work with older tube transmitters that do not have logic-level keying inputs. The relay coil has an internal transient suppression diode; therefore, installation orientation is important.

A piezo ceramic sounder, SP1, attached to digital I/O port RC0 provides an audible side-tone during keying. The user can turn on/off the side-tone via the control software.

A yellow light-emitting diode (LED), D2, is used to inform the operator when the software is measuring a key press. This helps reduce keybounce errors by letting the operator know when to lift the pencil point and move on to the next character. The LED is controlled via digital I/O port RC1.

A second LED, D1, controlled via port

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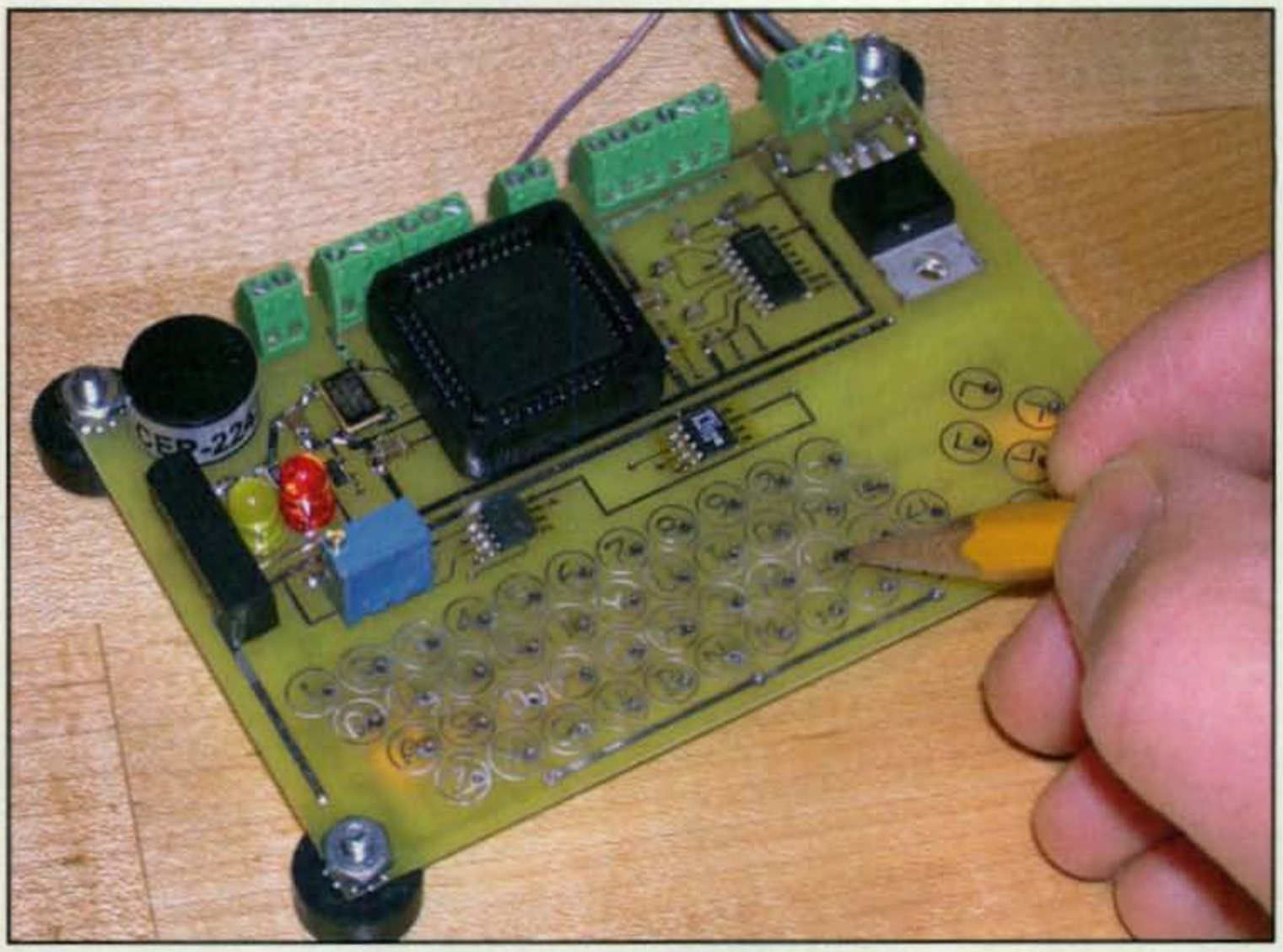

Fig. 3– PCB through-hole "via" junctions provide a target for the pencil point when touching a character. The artwork for the characters is etched into the copper, so a silkscreen mask is not necessary.

RC2, is used to inform the operator when a sequence of characters is being stored into memory for later recall.

A Maxim Integrated Products RS232 level converter/driver, U4, converts TTL voltage levels from the microcontroller to bipolar voltage levels used for RS232 interfaces. The integrated circuit was added to allow the microcontroller the capability of sending the equivalent ASCII character of each CW character to an external device via an RS232 interface. For example, an LCD display with RS232 interface could be attached to J4 to display each of the characters being sent. Having an RS232 output allows the miniature keyboard to be used in a variety of projects requiring data input.

The circuit is powered via an external 9-VDC power supply or a 9-VDC battery. Voltage regulator U6 converts the unregulated 9 VDC to +5 VDC. The op-amp and comparator derive power from ±10-VDC levels generated by the RS232 driver chip, U4.

Circuit Construction—Don't Be Intimated by Surface Mount

Another goal of this project was to work with surface-mount components. It is becoming more and more difficult to purchase new integrated circuits in older DIP-style packaging. Therefore, this project was an opportunity for me to improve my skills working with surface-mount components. Also, miniature surface-mount components enabled the entire circuit plus keyboard to fit onto a 3.8" × 2.5" PCB (fig. 2).

PCBs Ordered via the Internet

The PCB board for this project was designed using free computer-aided-design (CAD) software by ExpressPCB <http://www.expresspcb.com>. For those not familiar with ordering PCB boards via the internet, this will amaze you. First download free PCB CAD software from the ExpressPCB website. The CAD software is very easy to use and includes a library of standard PCB components. The artwork for this project was developed using a two-sided PCB and is available for download from the *CQ* magazine website; go to <www.cq-amateur-radio.com> and look for the link to "CW Keyboard files" on the October highlights page.

PCB through-hole "via" junctions are used at each keyboard character location to provide a touch target for the pencil point (fig. 3). Also, a circle with the appropriate keyboard character was etched into the PCB, acting as the text for the keyboard. No silkscreen mask was necessary, thereby reducing board cost. After completing the PCB design, you simply connect to the internet; the PCB design software calculates the board cost, transmits the CAD file and your credit card info to the vendor's server, and in three business days the board is in your hands.

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Construction

A number of the circuit components for this project are surface mount. If you are new to surface-mount soldering, I would suggest reading "Surface Mount Technology – You Can Work With It" by Sam Ulbing <http://www.arrl.org/tis/info/pdf/9904033.pdf> *(also see "Introduction to Surface-Mount Devices," by Dean Poeth, K8TM, CQ, April 2003, p. 36; and "Homebrewing Surface-Mount Style, K4TWJ's "World of Ideas" column, CQ, Sept. 1998, p. 46—ed.)*. The key to surface-mount soldering is having a good magnifier lens, a soldering iron with a fine soldering tip, tweezers, and small-diameter rosin-core solder. A third-hand tool is useful for holding a component in place while tack soldering the first connection.

To increase the contrast of the miniature keyboard keys, it is helpful to mount two yellow LEDs, D3 and D4, shining on the bottom side of the PCB (fig. 4). The light from the LEDs will pass though the PCB board, making a nice backlight for viewing the keyboard.

Take Out That No. 2 Pencil

Not to bring back bad memories of taking multiple-choice tests using a No. 2 pencil, but a No. 2 pencil is a good choice for this project. The soft lead provides a good connection when touching the keyboard PCB character junctions. Cut the eraser end off the pencil and attach a flexible wire to the exposed lead. This can be accomplished by soldering the wire to a push-pin and pressing the pin into the pencil lead. Miniature coax works well and provides shielding of the wire if necessary. The wire connects to connector J3.

Software

The 18F452 microcontroller must be programmed with the object code in order for the circuit to function. The HEX-formatted code is also available for download from the *CQ* website; go to <www.cq-amateur-radio.com> and look for the link to "CW Keyboard files" on the October highlights page. Connector J1 on the PCB allows connections to an in-circuit programmer, or the microcontroller IC can be programmed externally and placed into the IC socket after programming.

Software routines were written to allow the following control of the keyboard:

• Send Characters—Touching a character on the PCB will send the CW character via the transmit relay, side-tone sounder and will also transmit the ASCII character over the RS-232 port.

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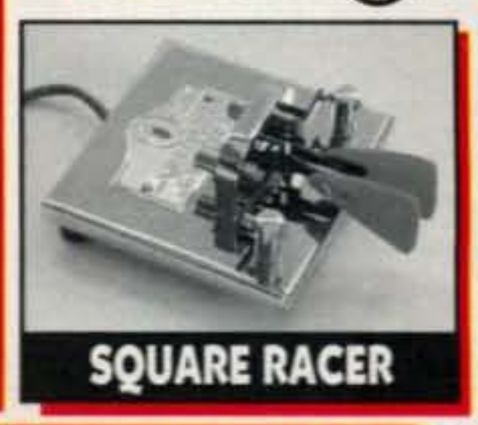
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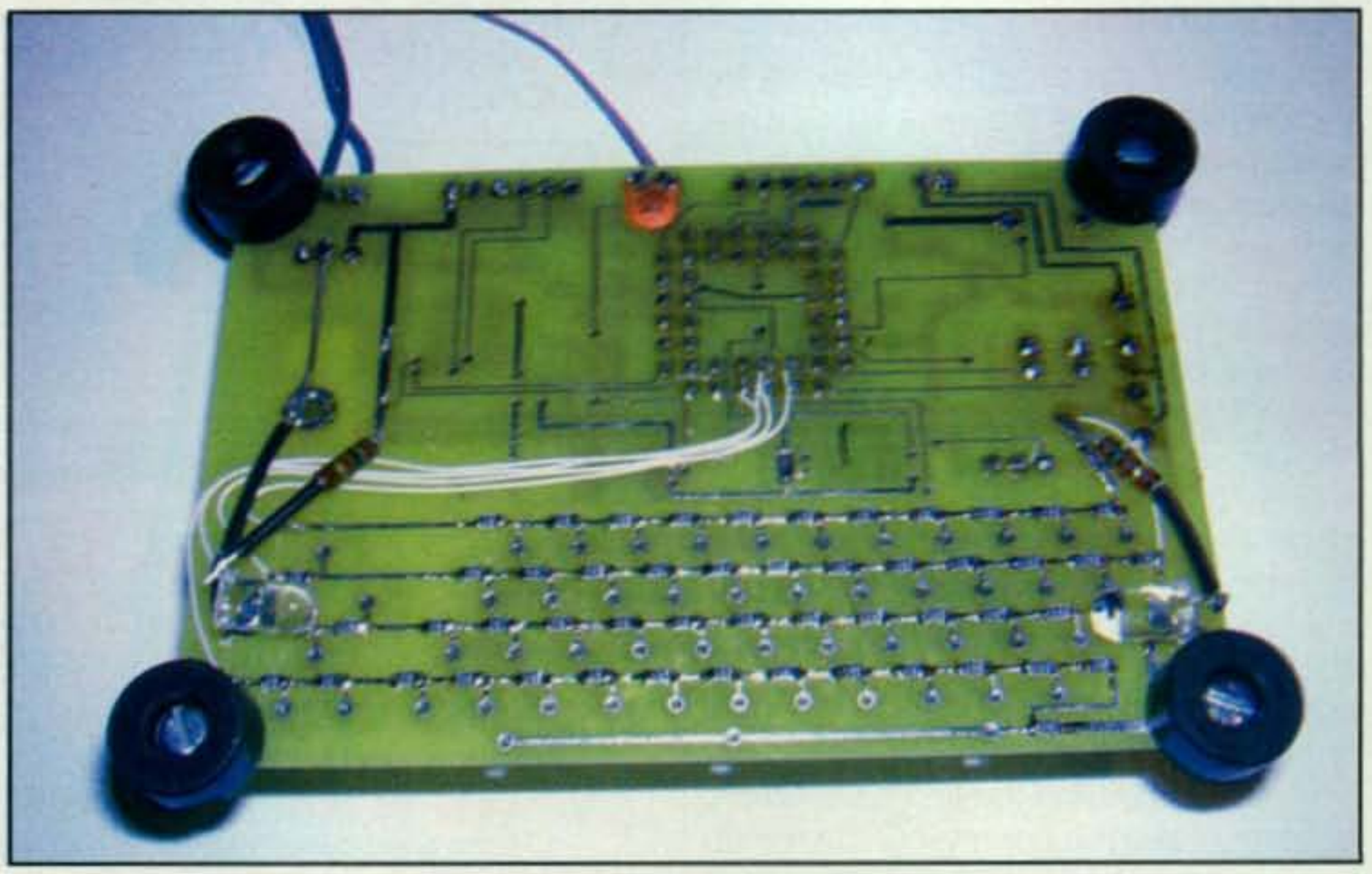

Fig. 4– Bottom side of the Miniature Portable CW Keyboard. The four voltage dividers, made up of 51-ohm resistors, can be seen with through-hole "via" junctions going to the top side. Yellow LEDs on the left and right illuminate the bottom of the PCB to provide backlighting.

• Change CW Speed—Touching the right ">" arrow keys will increase the CW speed. Touching the left "<" arrow keys will decrease the CW speed.

• Storing a Message—Touching the shift "Sh" key, then "M" key followed by a number key "1 to 5" will allow up to five 30-character messages to be stored into the microcontroller's electronically erasable programmable read-only memory (EEPROM). The red LED, D1, will light during the programming operation. When done typing the message, press the "Sh" shift key again. While typing the message, the transmit relay is disabled and the side-tone is active. The message will be saved to the microcontroller's EEPROM, which retains memory even if the power is cycled on/off.

• Recalling a Stored Message—Touch the shift "Sh" key followed by a number key "1–5." The stored message will be transmitted.

• Turning the Side-Tone On/Off—Toggle the side-tone on/off by touching the shift "Sh" key following by the "S" key.

• Help Menu—Touch the shift "Sh" key followed by the "H" key.

Conclusion

Once I assembled my Miniature Portable CW Keyboard, I was ready to get on the air and make my first contact. I started calling CQ on 40 meters and was amazed that no RF was getting into the pencil-point voltage probe even while running 100 watts. K8DDB came back to my first CQ, and it was time to hunt and peck out my first QSO. Mike was patient as I fumbled around trying to find the keys on the keyboard. We had a nice QSO, discussing the details of my miniature CW keyboard.

Being a touch typist, I was not used to hunting and pecking at a keyboard. The standard keyboard layout was not as obvious as I had thought for finding the characters. After some practice, though, I was sending out smooth CW. Smoother CW might be achieved with a keyboard layout with the characters arranged in order. This should make locating a keyboard character easier for some.

The analog/digital controlled keyboard also worked rather well. Occasionally an incorrect character is sent if I lift off a PCB character junction too quickly, not allowing sufficient time for the connection to debounce and be read by the microcontroller. The keyboard design, with only six connections, certainly simplified the PCB layout and provides the opportunity for the keyboard to be designed into other applications. How about a larger PCB, the size of a clipboard, to hold your paper with an integral CW keyboard to send CW?

The Miniature Portable CW Keyboard may also serve as a code practice oscillator. The person sending does not need to know Morse code, since the keyboard is providing the translation.

For those radio amateurs who enjoy operating CW using a keyboard, this simple miniature keyboard is portable and allows the user to send code smoothly via a touch from a pencil.

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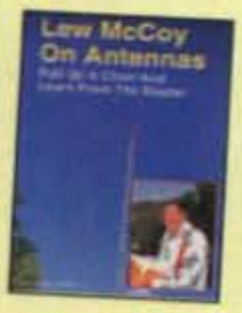

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60 Great Things About Ham Radio

In celebration of *CQ*'s 60th anniversary in 2005, we've come up with 60 great things about ham radio which we'll bring you each month, five at a time. We're sure you'll have more great things that we haven't thought of, so when we're all done, we'd love to compare our list with yours.

—W2VU

This month we'll focus on unusual propagation (mostly on VHF) that lets you talk farther than you'd expect...

46. Worldwide DX on 6 meters (once or twice every 11 years)-One of the reasons why 6 meters is called the "Magic Band" is because with enough patience, you can work some great DX on what's normally a local band. The best of the best comes every 11 years or so, at the peak of each sunspot cycle, when the band opens up for worldwide DX.

47. Double-hop sporadic-*E* —You don't have to wait 11 years for this, although it happens more frequently at sunspot peaks. While "regular" sporadic-*E* propagation on 10, 6, and even 2 meters is predictable and can open up a seemingly dead band for some good domestic DX, *double-hop* sporadic-*E* can give you cross-country contacts on 6 in between sunspot peaks. Summertime is best for this type of propagation.

48. Tropospheric ducting—This is literally a VHF and UHF pipeline between two distant points, usually over water and under specific weather conditions, that gives you the ability to make faraway contacts on 2 meters and above. The best-known duct makes it possible to stand on a beach in California with an HT and talk through repeaters in Hawaii, more than 2000 miles away!

49. TEP and aurora—These propagation types are most often limited to certain geographic areas. You generally need to be in or near the tropics to take advantage of *Trans-Equatorial Propagation*, or TEP, which links two locations that are equidistant from the magnetic equator and accounts for 6-meter contacts between Texas and Argentina, for example. On the other hand, you generally need to be pretty far north to bounce radio signals off the *Aurora Borealis* (Northern Lights) to make long-distance VHF contacts. (It occasionally is possible for stations outside the normal TEP and aurora zones to make contacts via these modes.)

50. Gray-line propagation—Really cool propagation isn't limited to VHF. Experienced HF DXers know to listen to the bands within an hour or so of sunrise and sunset for enhanced paths to stations on the other side of the world who are within an hour of sunset or sunrise, respectively. This is known as *gray-line* propagation, referring to the constantly shifting zone that is neither in full daylight nor full darkness.

We'll be back next month with another installment...

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BY DAVE INGRAM,* K4TWJ

Classics Alive—The 6L6 Lives On!

Unbelievable but true! The little wood-framed 6L6 transmitter we featured in last year's (October 2004) "Homebrew Classics" column proved to be so popular that notes of encouragement and support blew our mailbox apart! Apparently, more of today's "old pros" than ever imagined started out with some type of 6L6 transmitter and are now intent on recapturing the romance with a second and more meticulously built version. That makes sense to us, as one-tubers are easy to assemble and a blast of fun to use on the air today with a similar era receiver. Yes, and some of the resultant rigs with their beautifully shaped tubes and glazed wood bases are true works of electronic art. We are sure you will enjoy studying these transmitters as much as their proud owners enjoy showing them.

This month's column thus revisits the ever-popular 6L6 rig plus takes quick peeks at another all-time favorite, the legendary TNT transmitter.

Readers' Rigs

Our first view comes from Ron Mudry, W6FPS (photo A). Using one of K4TWJ's parts packs, Ron built his 6L6 transmitter on a beautifully finished wood-type chassis complete with front and rear mini-panels. Tasteful layout of components with holes for passing wires between top and bottom sections ensures maximum safety and makes this gem a real working showpiece guaranteed to complement any home, office, or ham shack!

Even before we featured the 6L6 transmitter last year in this column, Mac Neill, W8ZNX, was busy assembling his own versions of the little treat, and they are nothing less than spectacular (photos B and C). The wood-framed version with pill-bottle coil form uses a trim little 6F6 and works 80 meters with a plate coil sporting 16 turns of #18 insulated

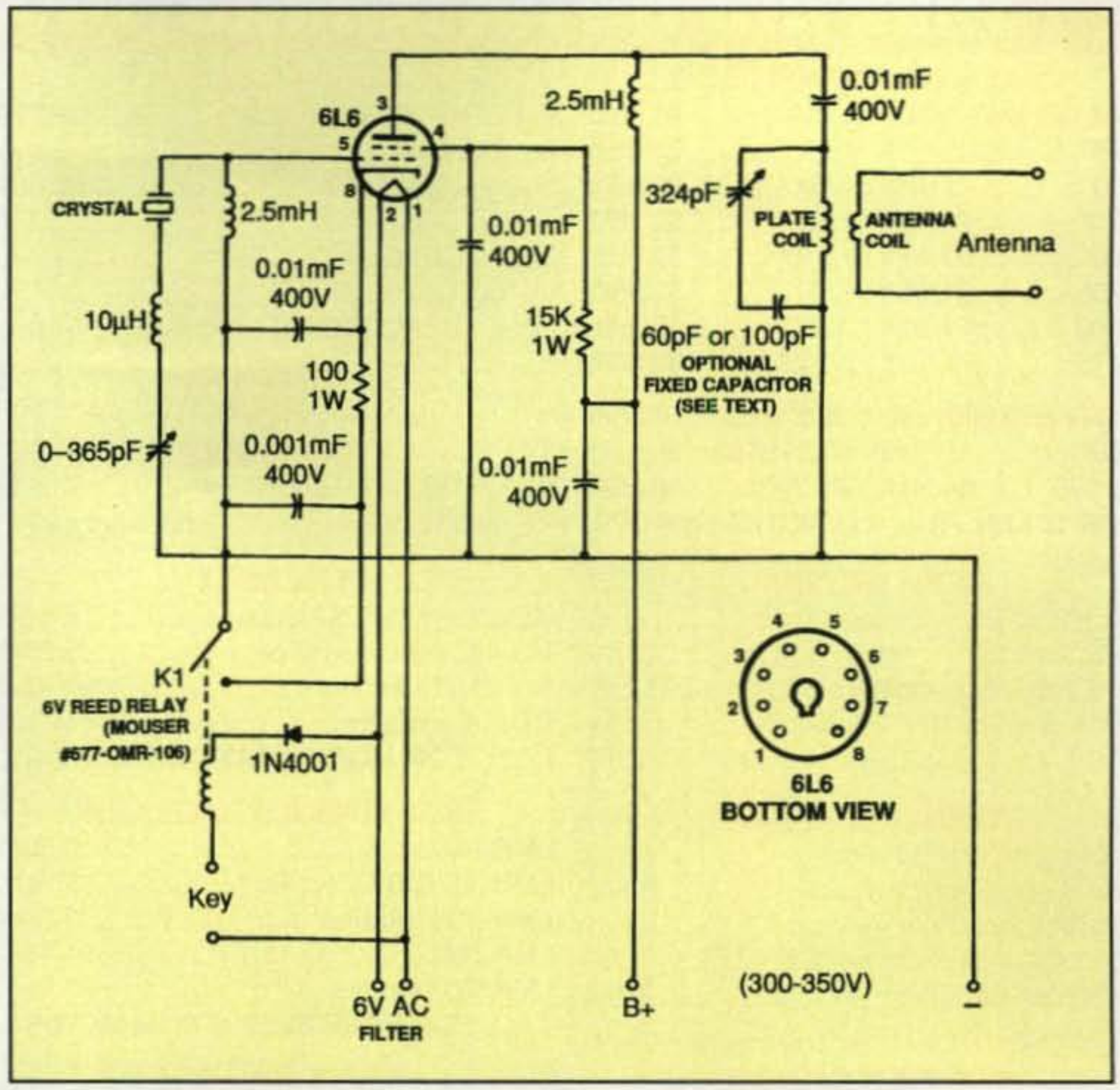
*4100 S. Oates Street #906, Dothan, AL 36301
e-mail: <k4twj@cq-amateur-radio.com>

Photo B– This wood-frame beauty built by Mac Neill, W8ZNX, could easily give any amateur homebrew fever. Just look at that shapely little 6F6, that striped wire coil, those snow-white ceramic sockets! (Photo courtesy of W8ZNX)

Photo A– Check out the class, flash, glitz, and glamour of this neat little 6L6 transmitter. It was built by Ron Mudry, W6FPS, and sports stained wood front and rear panels set on a beautiful wood base/chassis with below-base wiring for safety. Transmitter has its own power supply and VXO frequency control and produces a romping good 40-meter signal. (Photo courtesy of W6FPS)

Photo C– Metal-envelope 6L6s are rather scarce but delightfully romantic little gems, especially when used in an open-air and breadboard-style transmitter lsuch as this one built by Mac, W8ZNX. Notice how side support rails raise the baseboard for easy adjustment of the large-skirted knob. Clever! (Photo by W8ZNX)

Fig. 1– Circuit diagram of a basic 6L6 transmitter as featured in our October 2004 "World of Ideas" column. This one also includes VXO and reed keying relay mod. (Discussion in text.) →



wire, a plate capacitor of 200 pFd, and an antenna pickup coil of 11 turns. The pill-bottle form is approximately 1.5 inches in diameter and 3 inches tall. The rig's circuit came from a 1950, 27th Edition of the *ARRL Handbook* and is, well, generic 6L6.

The wood-chassis-style 6L6 transmitter (photo C) is called the QSL 25. Mac built it from an article in April 1941 *QST* written by Fred Sutter, W8QBW, and it uses a now scarce as hen's teeth metal 6L6. The tube may not glow in the dark, but it can pump out 8 watts of DX-grabbing power. In fact, Mac worked into Europe with it—on 80 meters. Now that's cooking!

Mac also built also built two more transmitters quite worthy of recognition: the big TNT unit shown in photo D and the metal-envelope 6AG7/6L6 treat shown in photo E. The TNT uses the famous VT-4C/211C "50 watter" tube 3-inch diameter copper-tubing tank coil and a bandspread capacitor connected in parallel with the main capacitor for easy frequency tuning. The "Two Tuber" is a Master Oscillator-Power Amplifier version built breadboard style, and Mac says it performs even better than it looks. Oh, those metal tubes, those coils, that recessed meter! If you are wondering, incidentally, a breadboard rig has all wiring above the board, while a wooden chassis rig has its wiring below the board.

Our special thanks to W8ZNX for sharing these heart-warming views. Those folks who wish to contact Mac directly can send him an e-mail at <macneillbookstore@sbcglobal.net>.

6L6: Radio's Original Glowbug

If you overlooked our October 2004 column's circuit diagram of the famous 6L6 transmitter, we have included it here "simple style" (without the transformerless high-voltage power supply or receiver mod) in fig. 1. The 6L6 and 6V6 were two of the most popular low-power tubes used in amateur radio in the past, and our highlighted circuit is only one of several employed. I favored this one mainly because its basket-weave coils look so classy. Quickly recapping, the coils are wound by zigzagging #18 insu-

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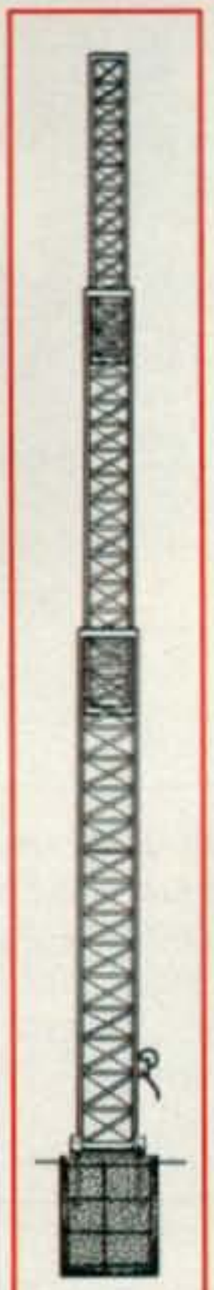

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HDX-5106MDPL	106'	24'8"	3700	$22,791	$20,799

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MA-770	71'	22'10"	645	15.5	5.5	$3,091	$2,799
MA-770MDP	71'	22'10"	830	15.5	5.5	$4,890	$4,449
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• Options include coax arms, raising fixtures, motor drives, thrust bearing, remote control panel, and more!

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TMM-433HD	33'	11'4"	400	$1,970	$1,789
TMM-541SS	41'	12'	430	$2,135	$1,939

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Photo D– Unquestionably, homebrew rigs are an ultimate form of self-expression! This magnificent TNT transmitter, built by Mac, W8ZNX, sports a famous VT4C/211C "50 watter" tube, classic knobs, Simpson meter, and copper-tubing tank coil mounted on genuine beehive ceramic insulators. The rig is akin to a giant oscillator covering 80 meters. Why two tuning capacitors? The left one is 400 pFd main tuning/bandset, and right one is 75 pFd/bandspread. (Photo by Mac, W8ZNX)

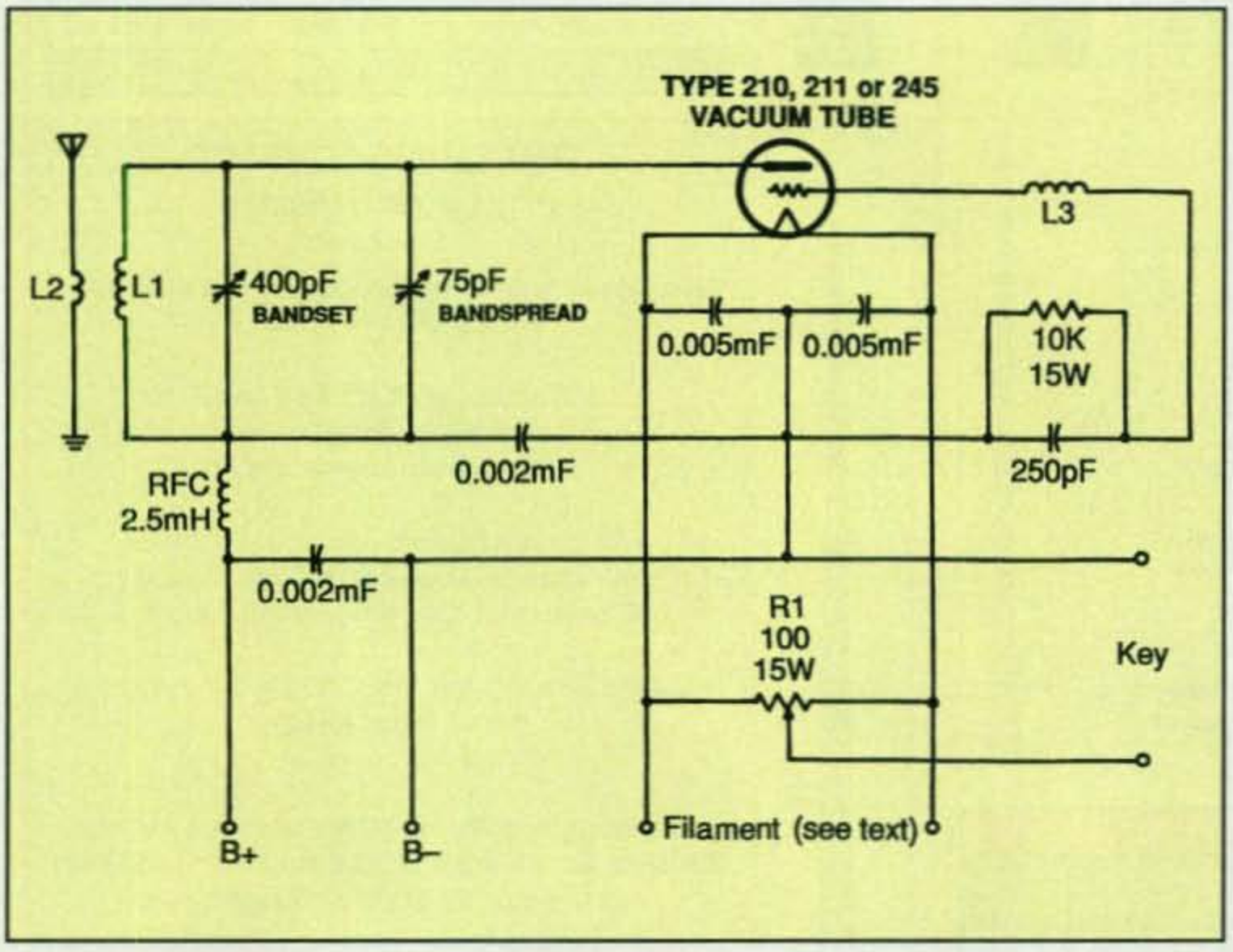


Fig. 2– Circuit diagram of the "50 watter" TNT transmitter shown in photo D. Fixed capacitors are the large "domino" type made by Sangamo.

lated wire between seven dowels equally spaced around a 2-inch diameter circle. The 40-meter plate coil is 13 turns and the antenna coil is six turns. Decrease the plate coil (only) to 11 turns, and the rig will work on 30 meters.

Simple one-tube transmitters are fascinating to see (especially those with new, fancy logo tubes from foreign manufacturers such as Sino, JJ Tesla, Valve Art, Grove, and Ruby), and they are great fun to use on the air. Exercise caution, however. If you have not worked with high voltage and vacuum tubes, **do not build or test any open-air tube-type rig alone!** Seek the guidance/assistance of an old pro with plenty of experience. We also encourage using a reed-relay or plastic-case key to avoid accidental shocks while transmitting (check <www.morseX.com> for plastic keys). Finally, we sense some readers asking, and yes, I still have a few parts packs available for building the 6L6 transmitter featured in our October column. They are $39.95 plus $5.75 postage direct from me to you (Dave Ingram, K4TWJ, 4100 S. Oates Street #906, Dothan, AL 36301). Drop me an e-mail (k4twj@cq-amateur-radio.com) or a postcard *before ordering* to ensure a parts pack is still available, and then specify if you want a crystal for 40, 30, or 20 meters when ordering the pack.

TNT and Dynamite

We sense that the 1930s-style TNT transmitter built by W8ZNX and shown in photo D has captured your attention and you would like more details so you can homebrew one. Jolly good show, but first (and most important), understand that this little cream puff is just a big self-excited oscillator capable of transmitting on any frequency within the range of its plate-tank circuit, and *you* are personally responsible for in-band operation. Also remember that like our 6L6 rig, *you must keep your hands and fingers clear of any wiring when it is on/in operation.*

The plate/tank coil (L1) is made of 1/4-inch soft copper tubing wound with an inside diameter of 2.5 inches. It consists of 12 turns for 80 meters, with coil turns stretched to produce an overall length of 4.5 inches. The antenna pickup coil (L2) is similar, but has only four turns. The mating variable condensers are approximately 400 pFd/bandset and 75 pFd bandspread, Johnson-type preferred for authenticity. The capacitors are scarce and expensive just like the knob, tube, socket, and Sangamo capacitors, but remember this is more than a transmitter. This is a prize collectable and a showpiece. The grid coil (L3) is wound with #30 wire and consists of 65 to 70 turns wound on a 1-inch diameter form approximately 2.5 inches long.

Filament and place voltage will depend on your selected tube. A #10, 210, or 245 requires 7.5 volts at 1.75 amps and a plate voltage of 350–500 volts. A 211/VT4 requires 10 volts at 3.2 amps for its filament, and since it is an oldie and a rarie, I would say no more than 700 volts on the plate. Use a highly filtered and regulated power supply and even consider applying pure DC to the filament for the cleanest possible sounding signal.

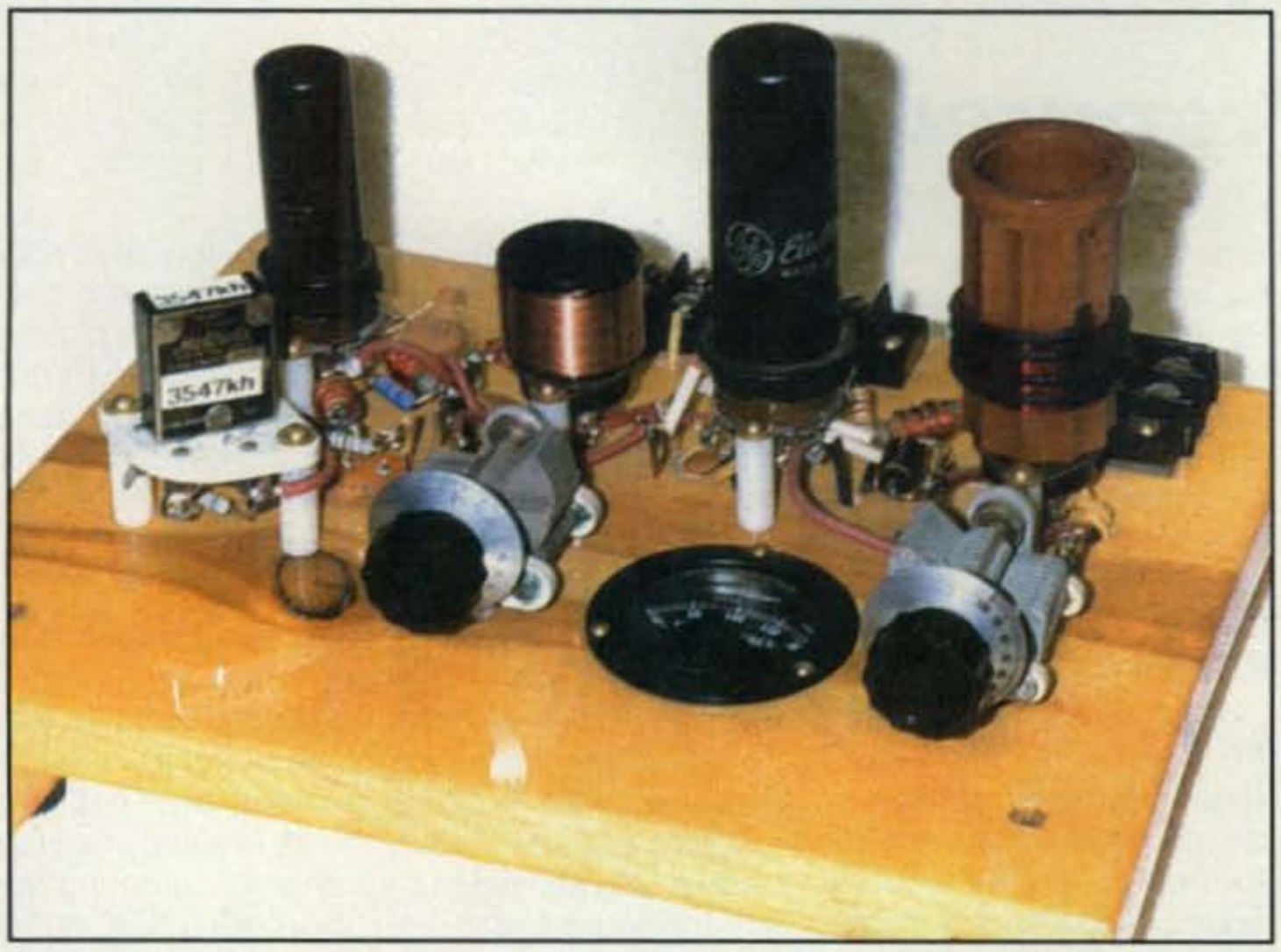


Photo E– Another W8ZNX marvel assembled breadboard style is this metal-envelope 6AG7 and 6L6 transmitter with all the frills, including Johnson knobs and flush horizontal-mounted plate meter. Dazzling! (Photo courtesy of W8ZNX)

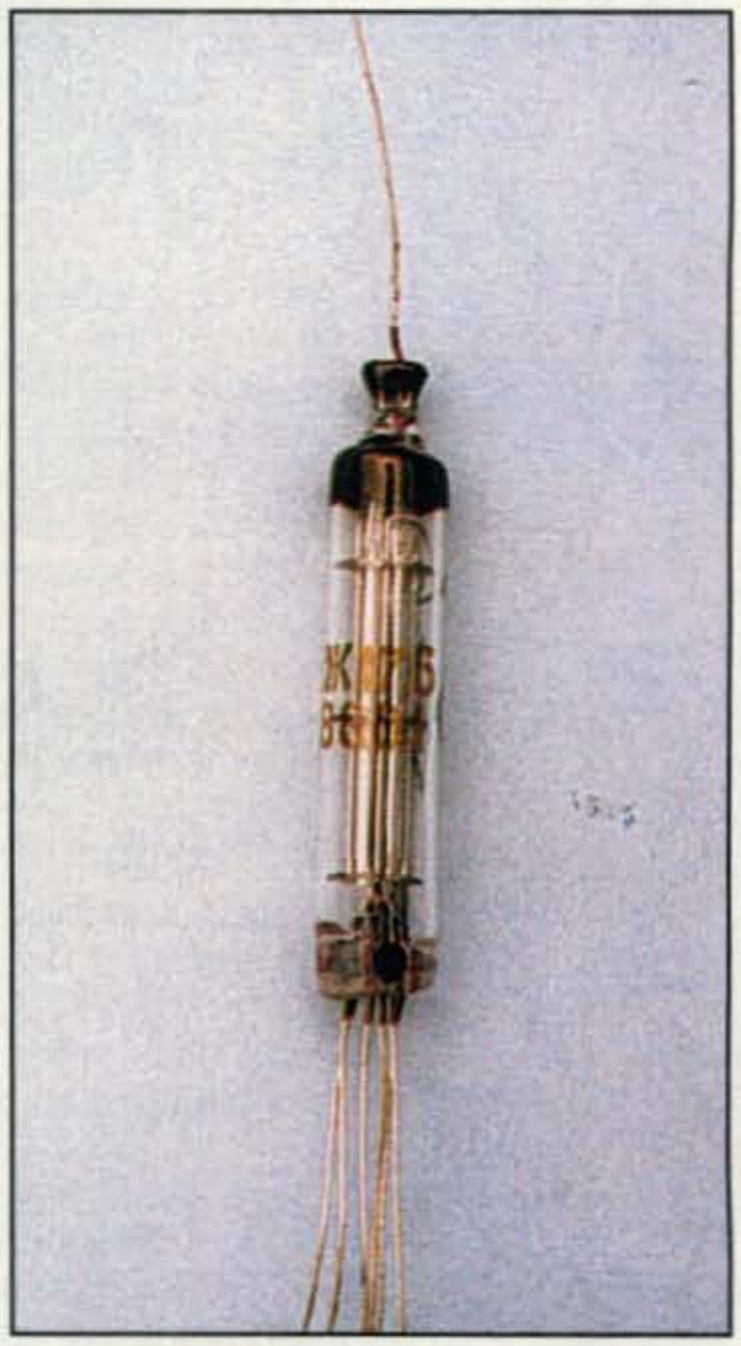
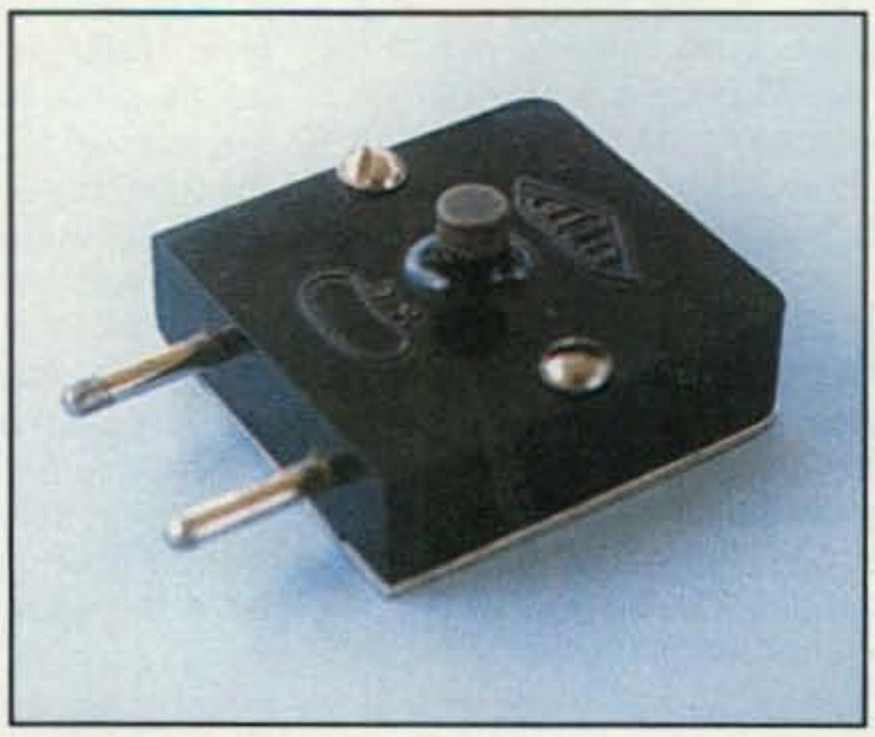


Photo G– What is it? A miniature Bantam tube like those used in 1950s-style hearing aids and spy radios. This one is the same diameter as a wooden pencil and 2 inches long. It is made in Russia, is brand new (note untrimmed pins), and is similar to a tiny 6L6 with its beam forming plates and suppressor grid "brought out" on separate pins. (Tube photo courtesy of Edmund Ramm, DK3UZ)

Photo F– Notice the knurled knob in the center of this Bud-case crystal from Tom Duncan, KG4CUY. The knob varies spring tension on one of the metal plates holding the (replaceable) quartz wafer inside, thus shifting its requency like a mechanical VXO. If we had only known this trick during our dear Novice days years ago. We would have been slipping and sliding more than Little Richard on Saturday night!



VXO Crystal

We all have heard tales of these unusual delights, but few folks have actually seen one. Now thanks to Tom Duncan, KG4CUY, of Huntsville, Alabama, the little critter has been captured and exposed (photo F). Look closely and you will note an authentic '50s era Bud logo on the case and a knob for shifting the crystal's frequency. Hands shaking with excitement, we loosened the case screws and peered inside (gosh, gee, what did ya see?). We found the crystal's back plate connecting with one plug pin, a quartz slab that looks like a refugee from an FT-243-case crystal, and a metal front plate with a spiral spring connecting it to the plug's other pin. That knob on the case front varies spiral spring tension, which in turn varies front-plate pressure on the quartz crystal—and its frequency. Looking over at a 1950s-style FT-243 crystal, we see no reason why this same high-tech arrangement would not work with other regular FT-243 crystals (gasp!). Give it a go and let us know how you fare. Our thanks to Tom, KG4CUY, for sharing details of this rare item!

Return of the Bantam

We told you about subminiature "Bantam" tubes in last year's spy-radio special column, and thanks to Edmund Ramm, DK3UZ, we can now show you one of these beautiful little rare gems (photo G). Bantams were used in hearing aids of the 1950s. They typically have a diameter comparable to a wood pencil and are around 2 inches tall. The one shown here is a brand-new Russian-made 1ZH17B that is being sold through an electronics distributor in Germany. I am now designing a transmitter using this fantastic little tube, and if all goes well, I may be able to offer kits in the coming months. Stay tuned!

Conclusion

Once again we have overflowed available space, and once again more "build them for fun" mini projects are waiting in the wings. Watch for some blowout good crystal sets coming next month and another one-tube special transmitter coming in early 2006. This one is really going to be a breadboard special complete with "can't miss" board wiring overlays (real printed circuits!). Meanwhile here's hoping we meet on 30 meters CW one evening soon. Keep on hamming!

73, Dave, K4TWJ

public service

BY BOB JOSUWEIT,* WA3PZO

Being Prepared

Earlier this year we wrote about how important it is to get the message out about an emergency in a timely manner. However, what do you do if the disaster occurs at your location or prevents you from participating in a drill or public-service event? This month we'll take a look at a few events that found amateur radio operators at the center of the emergency and discuss how hams were able to provide communications for a statewide hospital exercise even though a real emergency was taking place nearby.

Hot Cayenne Peppers

In late July this year Utah amateur radio operators gathered at a Bryce Canyon hotel for a hamfest and convention. Amateurs were on hand to learn about emergency communications and portable antennas and enjoy fellowship at a "Dutch Oven" picnic dinner.

Late Saturday morning Bob Craven, the Emergency Operations Center Coordinator for the Utah Division of Emergency Services, was giving a presentation entitled "Emergency preparedness...WHAT IF?" when word came to evacuate the building. More than 50 people had become ill when a noxious substance spread throughout the area. They were suffering from breathing problems, headaches, dizziness, and nausea. Dennis Motschenbacher, K7BV, told the ARRL, "It was fantastic to see people go into emergency mode. The calmest people there were the hams." Several Amateur Radio Emergency Service (ARES) members grabbed their "jump kits" and rendered assistance to those suffering the effects of the fumes. Others help direct emergency-service personnel as they arrived on the scene. At least 40 people were transported to local hospitals. Craven said that it "tested a lot of emergency responses that were going to be tested anyway in September, such as emergency surge at the hospital and decontamination, and everyone has done very well." Over 300 motel guests were relocated to other buildings in the area.

By Sunday morning hazardous-material experts had determined that the substance was pepper spray on the wall of a guest's room near the ventilation system. From there it spread to other parts of the building. Pepper spray is an irritant that causes severe pain when it comes in contact with the skin. It is made from cayenne peppers. According to Wikipedia.com, an online encyclopedia, pepper spray acts as "an inflammatory agent, causing inflammation in the mucous membranes of the eyes, nose, throat, and lungs." Other symptoms include temporary blindness, loss of balance and muscle coordination, severe skin irritation, difficulty breathing, and gagging. Anxiety and panic attacks may also occur, especially when breathing difficulties are experienced. A person can feel the full effects of pepper spray for 30 to 45 minutes. The most common treatment for pepper spray inhalation is fresh air and time. Some relief can be obtained by flushing eyes with water.

Trouble at the Jamboree

Five Boy Scout leaders were killed as the 2005 Boy Scout National Jamboree got under way at Fort A.P. Hill near Fredericksburg, Virginia. Four Scout leaders from Alaska were electrocuted the first day while erecting a metal tent pole that touched a power line overhead. In a separate incident, a 57-year-old grandfather volunteering as a security guard and directing traffic died from a heart attack. However, the problem that affected the greatest number of people was a heat wave that was sweltering even by Virginia standards.

"The brutal heat was producing temperature indices of 105 to 115 degrees and higher, and few people had access to air conditioning," said amateur radio volunteer Bill Morine, N2COP, of Wilmington, North Carolina. Morine was a staff member of K2BSA, the amateur radio station at the Jamboree (see July *CQ*). "The Army kept refilling water buffaloes, which are large tanks on trailers, so water was ample and easily accessible, but it brought little relief," said Morine.

By the third day of the Jamboree on July 27th, the forecast was for temperatures to reach 100 degrees with a heat index of 117. Morine said "spirits were bolstered by the hope that President Bush was to appear that evening at the 'Arena Show,' an extravaganza held in a large, outdoor amphi-

K2BSA became a center point of communications as thousands of scouts left the main stage and headed back to their camps. (Photo courtesy of Bill Morine, N2COP)

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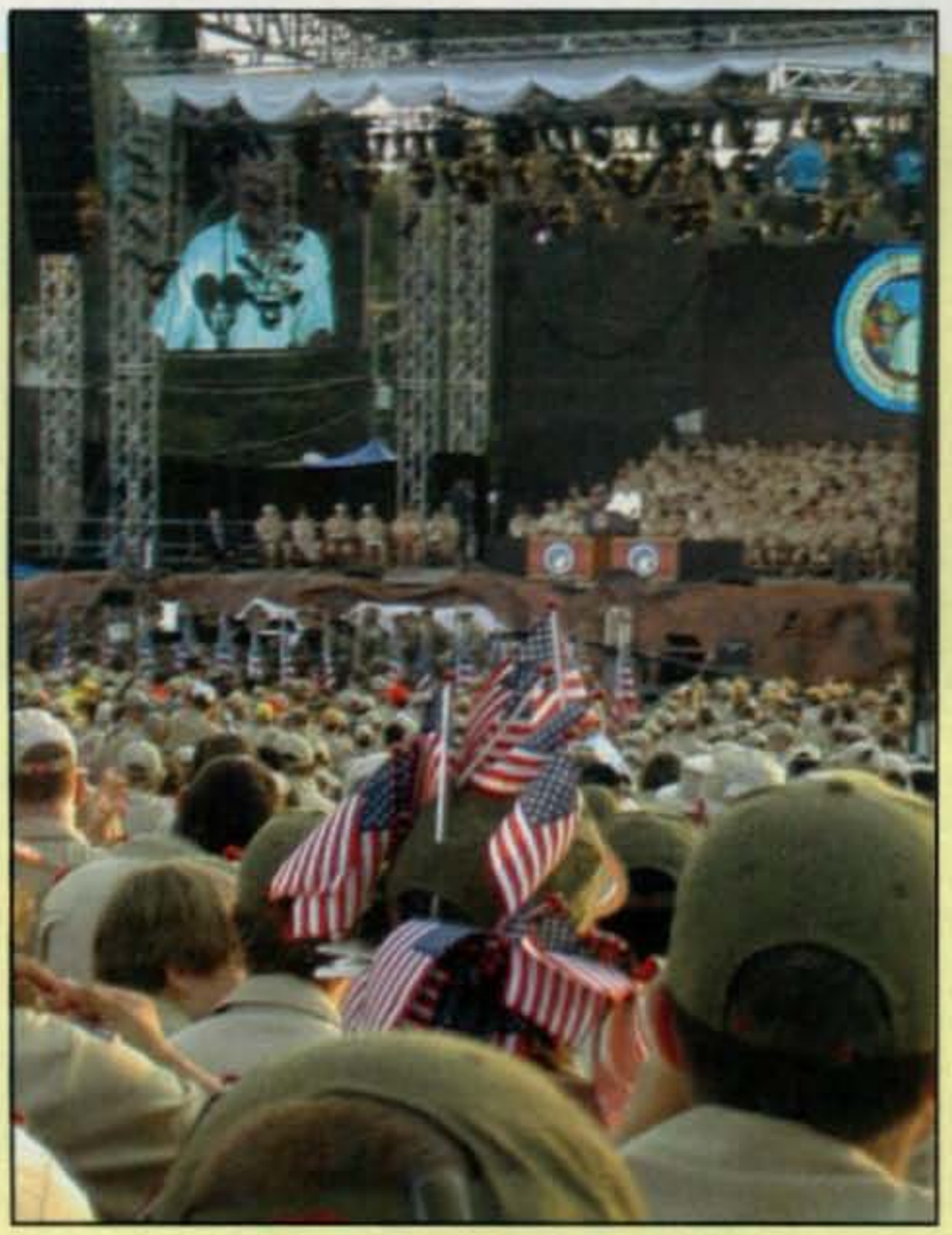


President Bush finally had a chance to speak to the 75,000 scouts camped out in 90-degree-plus weather. (Photo courtesy of N2COP)

Bill Morine, N2COP, and son Grant, W4GHM, take a break from staffing K2BSA/4. (Photo courtesy of N2COP)

theater." However, a presidential security measure unwittingly led to significant problems with communications, or lack thereof.

Word had filtered throughout the 20 sub-camps where the 33,000 scouts were housed that no cell phones or two-way radios were allowed inside the amphitheater, and that guards would confiscate them as people passed through metal detectors at checkpoints into the arena. Most scouts and leaders locked away their cell phones and FRS (Family Radio Service) handie-talkie radios in their foot lockers for the evening. Bill Morine, N2COP, picks up the story:

The President was scheduled to land at 6:50 PM, so the boys lined up as early as 3:30 PM to start their march in full uniform to the arena. The distance from the sub-camps to the amphitheater was anywhere from one and a half to almost three miles each way. There was plenty of water along the route, but the heat was stifling. Some 60,000 scouts, leaders, and visitors had crammed into the arena by 5:30 PM. Jamboree staff members tossed sports bottles of water to boys and leaders sitting on the ground as fast as they could. Still, the heat was overpowering. Numerous people could be seen being treated for heat exhaustion throughout the arena.

Then, shortly before 6:00 PM, national scout leaders announced that the show would be cancelled that night. A cold front was approaching, bringing with it a line of severe thunderstorms. Earlier in the afternoon, county officials throughout the Richmond vicinity had declared a 'Red Alert,' meaning keeping outdoor activities to a minimum. With the storm expected to reach Fort A.P. Hill at around 7:30 PM, the decision was made not to let the President fly to the army base, and indicating that scout troops should walk back to their sub-camps before the storm arrived.

The sense that troops had to move quickly before the thunderstorms caused chaos. While no panic arose, there was no orderly dismissal. Soon individual scouts and patrols were separated from their troops. Overlaying the scene were the now pandemic cases of heat exhaustion. Numerous MPs and civilian public-safety officials were repeatedly asking rows of scouts and leaders along roads leading from the arena to part way for ambulances to pass. Since scouts and leaders had left their cell phones and FRS radios back at their sub-camps, there was no way for leaders to coordinate communications with their scouts or to find out information about those who were being treated.

Meanwhile, several staff members from K2BSA, the Jamboree's mammoth amateur radio complex, had elected not to go to the arena show and stayed at the station. Suddenly people leaving the arena got access to handie-talkies, as the 300-plus population of amateur radio operators at the Jamboree began to pass vital traffic. There were amateur operators in every sub-camp, and at least until midnight, the temporary K2BSA 2-meter repeater passed messages on the whereabouts of missing scouts and leaders, and coordinated troop movements across the 3000-acre Jamboree site. By the end of the night dozens of people had been tracked or located using amateur radio. It was a shining moment for amateur radio and its public-service capabilities.

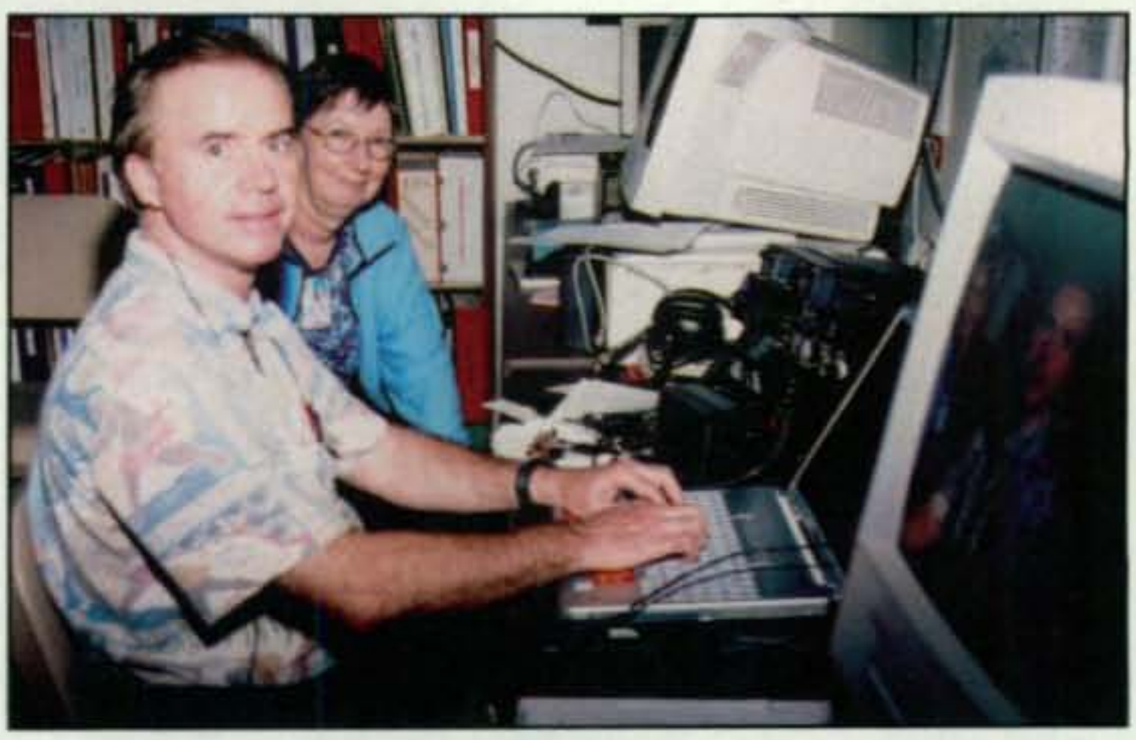
Official reports indicated that 300 people were treated for heat-related injuries, with 30 being taken to the hospital. However, Morine said that independent conversations with medical staff on site indicated that there were closer to three times that number. Many scout leaders and public-safety officials came away with newfound respect for amateur radio and the dedication of its operators.

Post Hurricane Support for Early Storm

In early July dangerous category 4 Hurricane Dennis struck the Florida panhandle with 145-mph winds. The National Hurricane Center warned of storm-surge flooding of 14 to 19 feet above normal tide levels. Rainfall accumulation was expected to be between 5 and 10 inches along the central Florida panhandle into southern Alabama.

After Hurricane Dennis came through, the Georgia Baptist Disaster Relief Team was called to Pensacola to assist the Red Cross. The Relief Team can provide feeding, clean up and recovery, and childcare, and has crisis intervention units that are designed to help people after a disaster. Georgia Baptist Hams Communications Unit Commander Chris Edwards, AEX4O, said, "Our communications unit performs mainly in a logistical nature for our units in the field. We have on occasion been helpful for ARES and SATERN (Salvation

Georgia Baptist hams effectively used this Winlink setup (TS-2000, modem, Windows® 95 laptop) to keep in contact with their main office. (Photo courtesy of Chris Edwards, AEX4O)



Kevin Bogan, AH6QO, and Bev Yuen, AH6NF, pause a moment during the FNpsk communications test. Both operators were testing KH6OCD from the basement of the Oahu Civil Defense Agency, making contact with NH7HI at North Hawaii Community Hospital on the Big Island of Hawaii. (Photo courtesy of AH6RH)

Communications for cleanup and recovery units following flooding caused by Hurricane Dennis were provided by Georgia Baptist hams. (Photo courtesy of Richard Elliot, KJ4O)

Army Team Emergency Radio Network), and we are there to help when we can."

The team's next stop was Sylvester, Georgia, near Albany. More than 100 homes there were flooded. The communications unit was necessary in this area, because cell phones were not very reliable, and here the unit put an HF Winlink station on the air to provide e-mail via radio. Edwards had previously used his Winlink equipment at home, so when it came time to operate in the field, all he had to do was put up an antenna. Edwards said that the relief team "sent about 35 messages during our three-day operation. All messages and attachments were received very well. We sent our daily reports, received weather information, and made regular contacts to our Task Force Leaders. It was good to see the system in action on HF. We will be interested to see how well we can use it in the future."

Hawaii Hams Participate in Exercise

On the island of Hawaii, amateur radio operators were preparing for a statewide hospital emergency preparedness exercise known as Waiponi II. At the same time a spreading brush fire prompted authorities to evacuate hundreds of people from portions of nearby Waikoloa Village. In a short period of time the brushfire had charred more than 25,000 acres of land. Evacuations were ordered for several subdivisions in Waikoloa. Fire officials said heavy winds and no rain made it very difficult to extinguish the fire. Many residents of the town were on the staff of the North Hawaii Community Hospital (NHCH) in Waimea. According to Norm Cohler, NH7UA, they "kind of took this fire in stride and continued with their duties as part of Waiponi II statewide hospital preparedness exercise."

The amateur radio communications portion of the event involved establishing emergency communications between NHCH and the Healthcare Association of Hawaii (HAH) operations center on Oahu. The HAH's operations center is located in the basement of the Honolulu Municipal Building, adjacent to the Oahu Civil Defense Agency OCDA (EOC), about 163 miles away from the site of the exercise in Waimea.

In Hawaii, amateurs who support hospital-related communications are organized into a support group known as Healthcomm. According to Healthcomm Director Bart Aronoff, WH6AA, this year's test involved the use of "SSB on 40 meters using a Near Vertical Incidence Skywave (NVIS) antenna, FM voice on a linked inter-island 2-meter repeater network, and PSK on a 40/80-meter NVIS antenna."

Operations were scheduled to start at 6:30 PM local time between NH7HI at NHCH and KH6OCD at the OCDA basement. On the Big Island, Norm Cohler, NH7UA, Steve Milner, WH6N, and Bart Aronoff, WH6AA, operated at NHCH, with Forrest McFall, K7CMK, operating as a relay station at home. On Oahu Healthcomm members were joined by amateurs from Oahu Civil Defense Agency and the Hawaii State Civil Defense, along with several observers, and trainees were present as a part of a training session.

Since trainees were present at OCDA, all training and operations were done without the use of headphones to let the trainees hear the audio and follow the progress of the exercise from the radios. The loud audio hindered the ability to pass messages simultaneously on both the HF and VHF stations, which were located next to one another. For future events a separate session will be conducted ahead of time

to explain and orient the attendees to the different modes and methods of operations. For a drill or the real thing operators will use headphones to improve their concentration.

The use of the relay stations proved to be instrumental, and the event would not have succeeded without them. On 2 meters KH6OCD established voice contact with K7CMK via the statewide civil defense repeater network on 147.06+ on Oahu and 147.02+ on Maui; K7CMK in turn relayed messages to NH7HI via the 147.16+ Mt. Hualalai repeater on the Big Island.

On HF there were delays in getting a good SWR match with the temporary wire antennas. Neither station could hear the other, and the transceivers were unable to produce a full 100 watts of power. During these tests Rick Ching, KH7O, provided liaison contact with both ends on 40, 80, and 2 meters, ensuring that the stations remained informed and coordinated during the tests. After some testing it was uncovered that the HF radios on the Big Island produced 30 watts and the Oahu radio produced only 10 watts. Other radios were brought in to establish better communications. A further complication developed as a DXpedition appeared on the exercise's 40-meter SSB frequency, causing confusion and forcing operators to change frequency.

Attention then switched to testing PSK on 40 and 80 meters. Attempts were made using Digipan and FNPsk to initiate contacts. BPSK31 and QPSK63 were attempted. KH6OCD could read PSK messages from NH7HI, but NH7HI could not receive traffic from KH6OCD. Tests on 3.580 MHz yielded the same results. After many trials the effort was called off.

A few moments later, Kevin Bogan, AH6QO, inspected the audio volume-control settings on his laptop and noted that the "Mute All" checkbox was set. That setting effectively muted the transmit audio from the laptop to the HF radio and accounted for the problem. Another attempt using FNpsk and QPSK63 quickly resulted in a successful PSK contact, although no formal messages were sent on this mode, since it was late in the exercise.

The entire communications exercise involving troubleshooting and the exchange of messages took about two hours. "If this was a real emergency," said Ron Hashiro, AH6RH, "the extra effort spent on troubleshooting would be rescheduled and the problems experienced would be overcome in minutes. Stations throughout the state would be listening for NHCH. They would immediately accept the radiogram messages and relay them via available methods. It reinforced the discipline and basic skill of passing and relaying radiogram messages by voice to immediately work around shortcomings in equipment and configurations."

"The support for the Waiponi II exercise demonstrated the teamwork and adaptability of amateur radio operators to work around real shortcomings that may arise during any simulated or actual emergencies," said Hashiro. "The obstacles uncovered are being worked on and will serve as the basis for improvements."

Additional information on the groups involved in the Hawaii drill is available on the following websites:

Healthcare Association of Hawaii: <http://www.hah-emergency.net>

Healthcomm: <http://aditl.com/hc/index.html>

With Thanks

This month the emergencies occurred close to home, and hams responded in a professional manor as they are trained to do. Each event demonstrated that advance training is important when the question goes from "What if?" to "What's next?" Check out the Public Service Forum on the *CQ* webpage. Each month we list websites that are referenced in this column.

This time we want to thank Bill Morine, N2COP; Chris Edwards, AEX4O; Ron Hashiro, AH6RH; and the ARRL for providing information for this article.

Do you have a public-service story to tell? Drop us a note. Until next time . . .

73, Bob, WA3PZO

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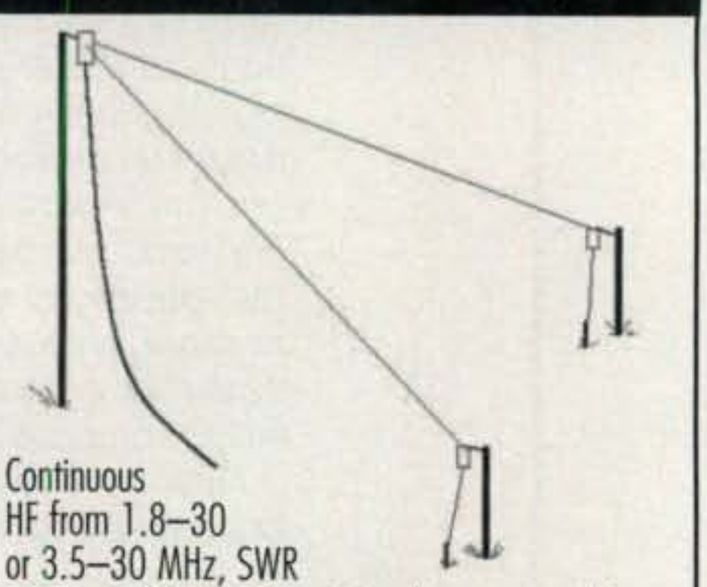

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digital connection

BY DON ROTOLO,* N2IRZ

Building a Decent RF Network

As the ARRL's HSMM (High Speed Multi-Media) project builds up steam, I sense that we'll be building more RF networks in the near future. Networks are nothing new, but it's surprising to me that many people who haven't been involved in the digital side of amateur radio for a long time try to reinvent the wheel when it comes to building a network. I wrote about this topic nearly ten years ago, and while much of what I wrote back then still applies, perhaps it's time to take a fresh look at building a decent RF network.

A brief word about HSMM: Many hams make the mistake of equating HSMM with "802.11 under Part 97," but it's much more than that. HSMM is a unified approach to making data compatible across many different platforms. While a decent network can be built with 802.11 equipment, a good portion of the HSMM working group's focus is on more efficient and robust HF communications as well.

Before we really get started, you should understand that good network design has nothing to do with the kind of networking software you use. Any software will perform poorly on a poor network. In addition, understand that this topic can fill a thick book, so what I'm covering here is necessarily brief and limited.

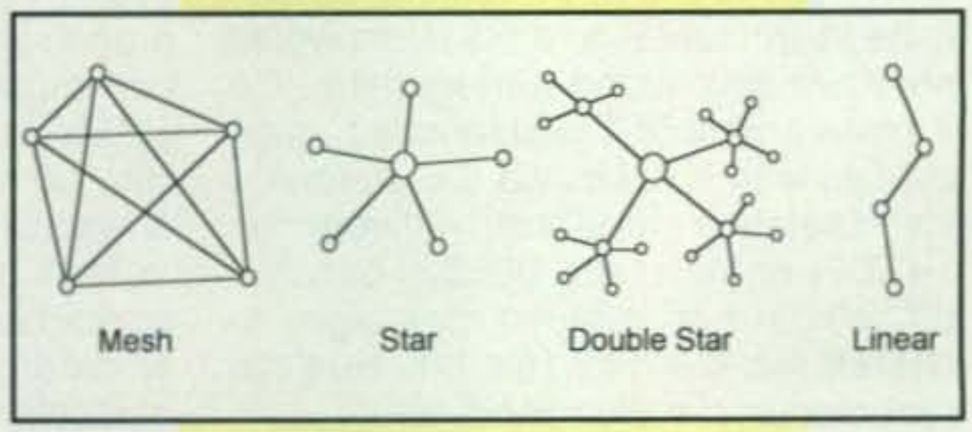

Fig. 1– Common network topologies. A mesh network is highly reliable, due to redundancy, and has the greatest capacity, but costs the most. A star network covers wide areas inexpensively, but a failure can cut off service and link capacity can be quickly saturated. The linear network covers long distances inexpensively, but with lowered reliability. Cost savings for star and linear can be used to "harden" the network to improve reliability somewhat, and carefully chosen alternative links can be cost-effective. Most real networks are a combination of all three types.

Network Facility Classes

To examine the two network functions more carefully, we can break down each function as either a *user port* or a *backbone.* Each of these types of facility has unique requirements and needs.

A user access facility is shared by a number of stations, all accessing a single *User Port.* These individual stations may or may not be able to hear one another, and they all have highly variable signal qualities, parameter settings, and data throughput requirements.

A *backbone,* in contrast, is a point-to-point link with only two stations on the channel. The two stations trade data only with one another, with good signal quality, and link parameters are set to optimize link performance. Subsets of the backbone are the *wormhole,* a link that passes through a non-amateur service (such as the internet), and the *gateway,* which provides direct access to another type of network, usually non-amateur. With many gateways, non-amateur access is possible, so access control must be considered.

Now we'll take a look at user ports and backbones, and how to best design them.

User Ports

First, a little background. In the RF world, when two stations try to transmit at the same time, they will interfere with one another if they are close enough in frequency and geography. This interference, known as a collision, distorts the signal enough to make the voice or data unusable. When two stations *do* transmit at the same time, there is a data collision, which renders both transmissions unusable. It should be clear that data collisions are bad, since they waste channel time, and must be avoided.

In the digital world, we simply listen on the channel for data. If we detect data, we wait until the channel is quiet to transmit. This is called Data Carrier Detection, or DCD, and it's a key part of CSMA (Carrier Sense Multiple Access), a common channel-sharing scheme used by many data networks, including AX.25 Packet and 802.11. Some other sharing methods include CDMA (Code Division Multiple Access) and TDMA (Time Division Multiple Access), used by some digital cellular telephones.

When someone puts up a user port, he (or she) may be thinking like a repeater owner, trying to maximize the port's coverage area. Installing a user port atop a tall building with a 100-watt transmitter may offer great coverage, and possibly boost the sysop's ego a bit, but this is poor networking practice.

The first problem encountered is the *Exposed Transmitter Syndrome* (ETS). This is where the user port hears so much RF activity that the DCD never turns off, effectively shutting it down. The channel is simply so saturated with data (at least from the port's perspective) that nothing works at all. One option for such a site is to install an attenuator in the receive side, so that fewer stations are heard, but this creates another serious problem, the *Hidden Transmitter Syndrome* (HTS).

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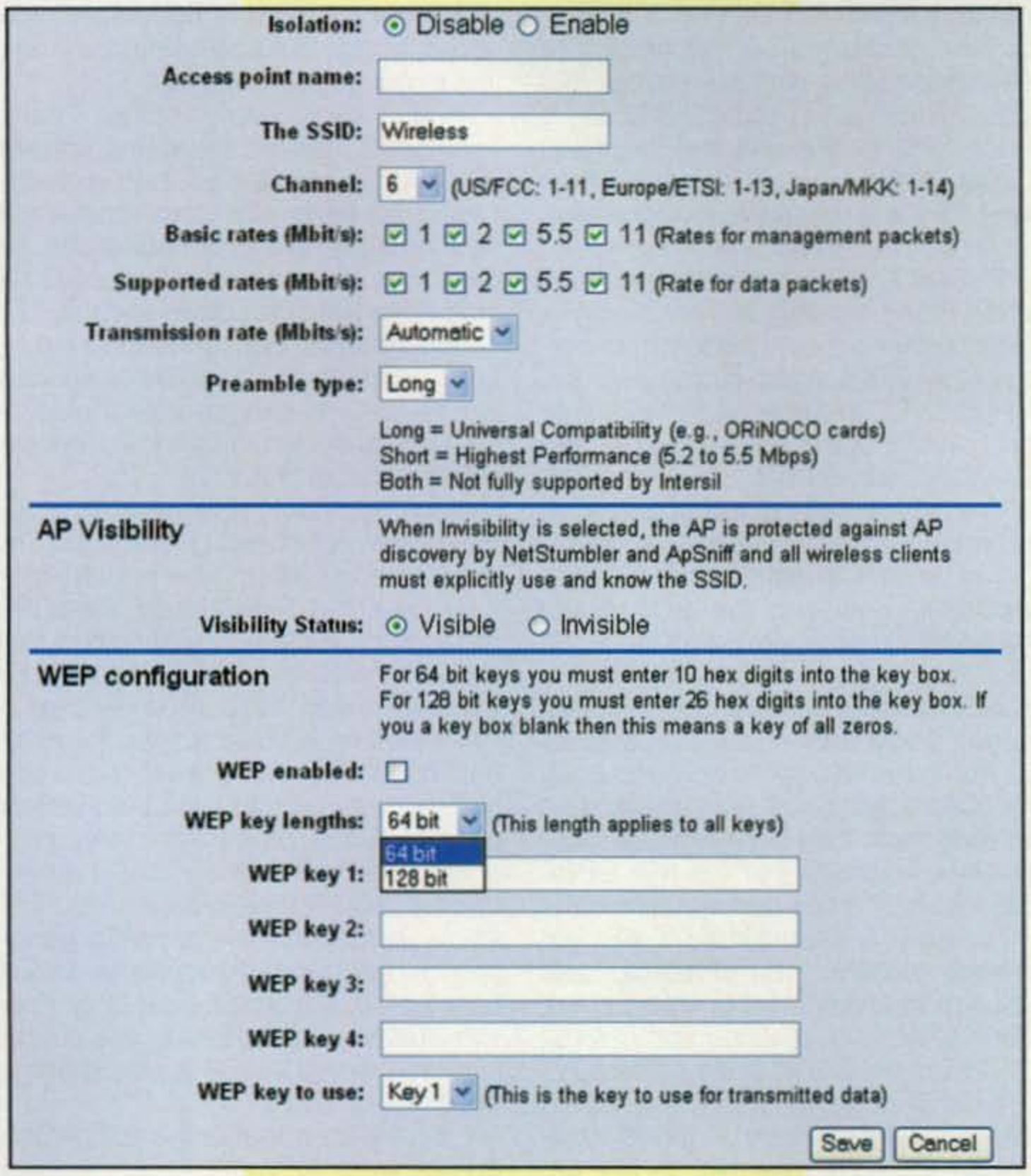

Fig. 2– The main configuration screen for my 802.11b Access Point (AP). Note that WEP encryption is not intended to limit access; instead it serves to prevent eavesdropping, not useful for amateur radio applications. A simple way to prevent casual access is to set the AP Visibility to Invisible, but then you need to worry about station identification (normally done by setting the SSID to your callsign) if you're operating under Part 97.

Hidden Transmitter Syndrome is the absolute worst thing that can occur on any shared data channel. In order for a CSMA channel to work properly, everyone on the channel must be able to hear everyone else. If this is not the case, a station might transmit while another station (not heard by the first station) is also transmitting, meaning the second station is a hidden transmitter to the first station. A CSMA channel that has hidden transmitters on it will always perform poorly, since a very large percentage of channel time is wasted on collisions. It should be painfully obvious that ETS and HTS are very bad things and must be avoided, even at considerable cost.

What can you do? Installing a full-duplex data repeater will solve HTS problems, but ETS can still be a problem where more than few hams can hit the repeater—not to mention the expense of a repeater. There's also the issue of using up two channels, plus the impracticality of a repeater for really wideband modes such as 802.11. The solution is really much less expensive, though, and de-ceptively simple—*Cellular User Ports.*

The Cellular Solution

Instead of creating a small number of wide-coverage user ports, the better way is to create a large number of relatively small cells, each supporting perhaps 10 to 20 users (of which only two or three may be active at a given time). Cells are placed near the users and designed so that adjacent cells cannot hear one another. Data is then transported on a backbone channel, where there are no users. Cellular phone companies use this scheme quite successfully.

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One cardinal rule of networks is that you *never* carry traffic on a user access frequency (something 802.11 likes to do, in its native version). When you do so, the channel capacity is immediately cut in half: half the time is used for the user to get the data to the user port, and the other half is used by the port in sending the data somewhere else. Sure, it costs a little more, but are you building a high-performance network here or just fooling around?

Backbones

The single most important thing you can do for backbone links is to insist that each one is a dedicated point-to-point link (DPPL). That means only two radios on any given frequency (hopefully not on a band where user channels can exist), with high-gain directional antennas pointing at one another. As soon as you introduce a third station to a backbone channel, throughput drops like a rock.

I really can't emphasize this enough. The reason behind this throughput loss is in the nature of the data transfer protocol. Packets of data (not only AX.25 uses packetized data) are sent, and a brief packet is returned to acknowledge the data packet, allowing the next group of packets to be sent. Because of the way the timing is set up, a third station causes additional waiting time between data and acknowledgement. That waiting time is wasted performance. For user channels it isn't as critical, but large-volume users ("large volume" is about 10% of the channel capacity) should be encouraged to set up their own DPPL into the network backbones.

It is far better to set up a lower speed DPPL than a higher speed shared backbone. When loading is very heavy—which is when capacity becomes important—the DPPLs will outperform the shared "zoo" channel. Again, it does cost a little more to do things right, but the results are worth it.

Given the realities of the typical amateur radio budget, it can be unreasonable to expect a large initial outlay of resources. However, the goal should always be to migrate towards the ideal, even if it is presently unattainable. If your present network already suffers a shared backbone channel, carefully monitor the data activity between each site. Often two sites pass more data between them than between any other two sites. Upgrade that link to a DPPL when the resources become available.

There are tools available to monitor wireless network performance, and although I haven't found one that's free, many offer free trial versions. Most 802.11 access points have some built-in functionality, at least for signal strength, while tools are generally available for other RF gear. As an alternative, the wired side of a link can be monitored, or test files can be sent across a link to gauge performance.

That brings up another point: Intelligently derived backbone speeds. If a multi-port network hub services three user ports and concentrates that data load onto one major backbone, the backbone must be able to handle the load without slowing down anyone. This seems obvious, but some people don't figure it into their plans. The data loading on each backbone link should be measured or estimated, and link speeds adjusted accordingly.

Once you have your network's performance optimized (given the resources available), you should start thinking about redundancy. Draw the network on a piece of paper and look for links that, if they fail, cause a part of the network to become unreachable. Then look for a place to install another backbone link, even a lower speed one, to provide a backup. It is reasonable to set up bunch of backup links on a shared channel, as long as it is really a backup and not a primary link. This saves money while preserving performance, since only two stations should be affected by a broken link. Only those two stations will be using the shared channel, with the others just listening, effectively a DPPL.

It should go without saying that tenuous or weak RF paths are unacceptable. Add power, or better yet, antenna gain to the link until it functions well; perform the basic link calculations and determine the actual fade margin. Antenna gain is usually cheaper than RF power, narrows the beam width to allow more reuse of channels, and helps your receiver, too. Breaking up a long path into two segments can also make a big difference, or you can move down in frequency for better propagation.

Avoid confusing radio networks with wire-based networks. There are far more wire-based network designers out there, but their knowledge and experience often doesn't apply to the RF world. Be wary of "experts" who don't have any experience with radios.

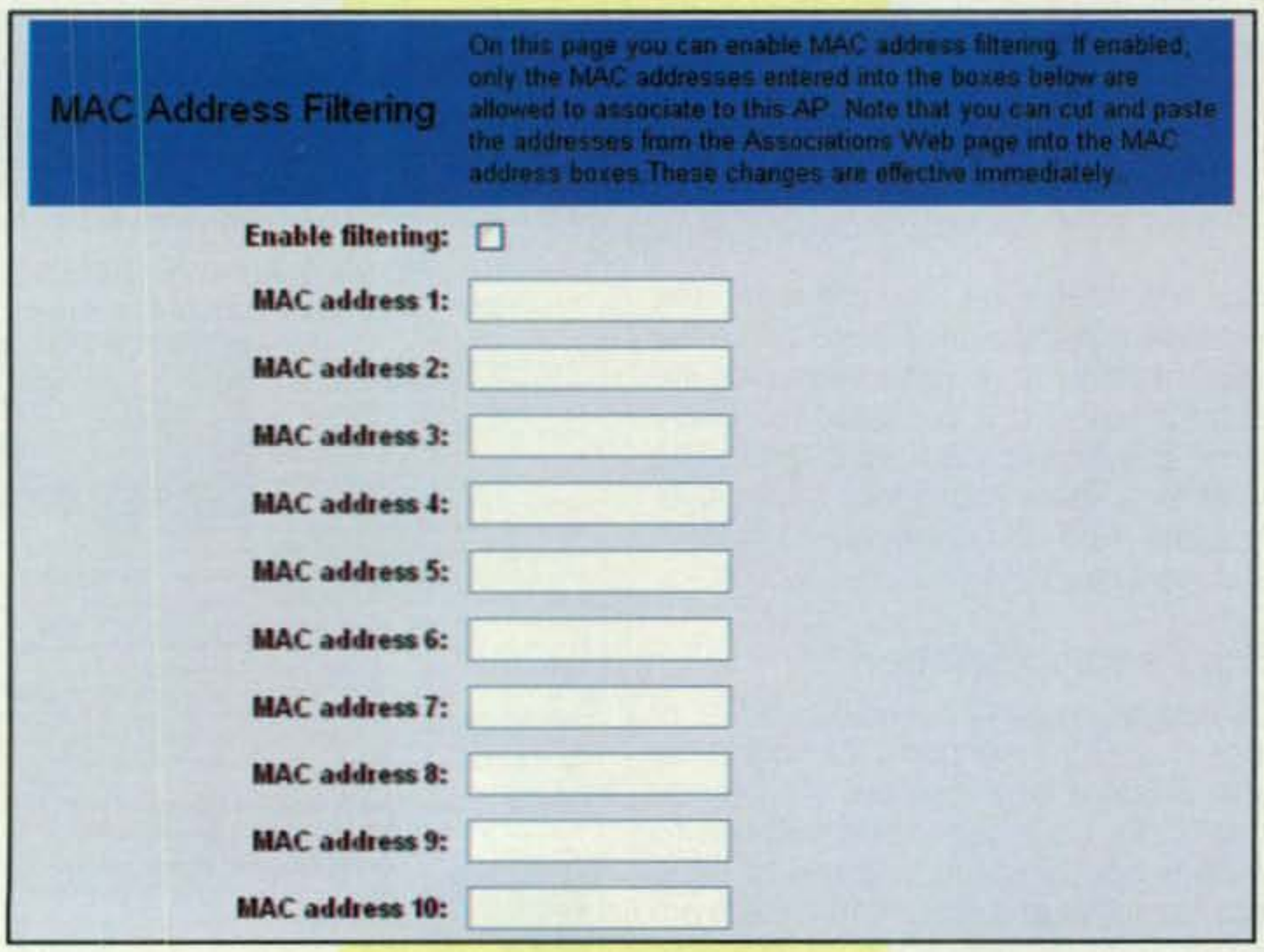

Fig. 3– On this screen you can explicitly set which network interface cards will be recognized by the Access Point. If the MAC address isn't on this screen, you will be unable to access the network. While hams will have to register with you for access, knowing who they are may help drum up support for network improvements.

Security

One commonly encountered issue when deploying a network using commercially available gear (such as 802.11) is the need to prevent non-amateurs from passing data over links operating under Part 97. Note that encryption such as WEP does nothing to prevent access to your network. It only prevents viewing of the data being car-

ried (see fig. 2). Instead what you need is access control.

Virtually all Access Points allow for access control based on the MAC address (a 12-character unique "serial number" assigned to every network interface card) of the wireless Network Interface Cards (NICs) trying to access the network. For user ports, the users will have to register their wireless LAN cards with you so they can be put into the access table. Backbone links should be set to recognize only one another, of course (see fig. 3).The downside is that any hams in the area will have to contact the network sysop to get into the network. This has advantages, however: Once you know who is using the network, it is easier to get them to support the network with time, talent, or treasure. You can also plan the network better, considering loading and HTS (Hidden Transmitter Syndrome). It definitely keeps casual intruders out. Although MAC addresses can be spoofed, you'd need to know what's on the list first. It isn't perfect security, but it should be more than adequate for our purposes.

Conclusion

There are many resources on the internet that will help you design a great network. Much of it is common sense, such as performing "link RF budget" calculations, and some of it is a bit more subtle. There will always be compromises based on limited resources, but there are some things on which you can compromise, and some things on which you should not.

Don't compromise, for example, on network topology. Running backbone data on user channels will bring performance to its knees. Don't wait for high-tech solutions when low-tech solutions will work sooner. Network design is a little bit logic, a little bit skill, a little bit politics, and a little bit luck. A well-designed network will always outperform a poorly designed one, often at lower cost. There are people out there who have spent their entire careers doing network design, so don't expect to become an expert overnight, but a little effort will pay off handsomely. There aren't many books out there that deal with radio-based networking design, but the engineering library at a local college should have something useful, even if it's only a single chapter.

Well, that's all the time we have this month. I hope you found this column interesting and useful, especially now as we find more and more uses for a non-internet network solution. As our RF-network performance improves to meet and exceed T1 and cable modem levels, we'll be seeing more and more hams—especially those with dial-up connections—preferring to get their ham radio information over radio instead of wires. Packet radio is almost dead, not because of slow data but because there was limited useful content. HSMM will have the content, something I am looking forward to.

Until next time . . . 73, Don, N2IRZ

Why Digipeating Won't Work

Before networks there were digipeaters. By hopping down a chain of other hams' TNCs (terminal node controllers, for the newbies among us), you could go farther than your radio's range. It sounds okay, until reality is considered. The problem is that digis are dumb; they just take what they hear and repeat it. The digi doesn't acknowledge your packets; that is done only by the destination station. Thus, each digi just passes your packet down the line, and passes the distant station's acknowledgement packet back up the line to you. In the real world, links between digis are not 100% efficient; not all packets make it through without getting lost or corrupted. Note that an 802.11 network extender is nothing but a digipeater.

If you use only one digi, you have to get across four links before you can send the next packet-two to get there, and two for the acknowledgement to get back. If we assume that nine out of ten packets make it on each hop (actually quite good), then that one-digi path has an efficiency of only $(0.9 \times 0.9 \times 0.9 \times 0.9) = 0.65$, or 65%. With two digis, it drops to 53%.

With only half of your packets making it through on any given try, it is very difficult, if not impossible, to pass any reasonable amount of data. If other users are on frequency, the hops get worse than 90%, easily down to the range of 50% per hop. Do the math and you'll see why for longer-distance communications digipeating just won't work.

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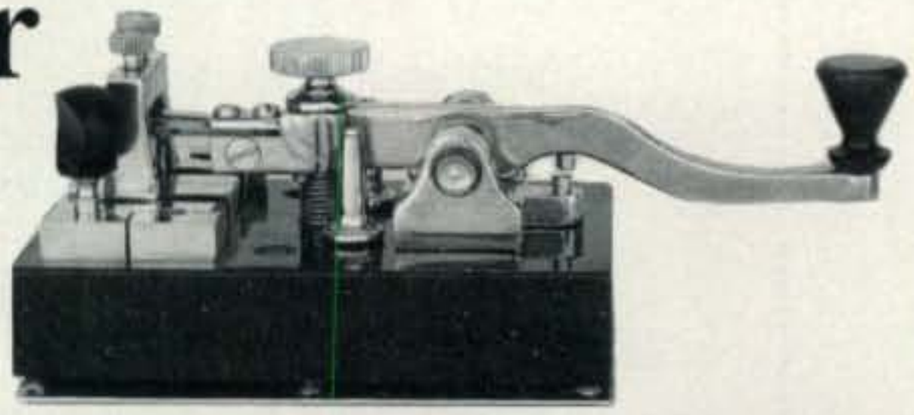

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qrp

BY DAVE INGRAM,* K4TWJ

Milliwatting to the Max

Several friends have asked us how to judge if their interest in QRP is casual or serious, and after thoughtful consideration the answer became clear. You know you are truly addicted to QRP when you start thinking about running really low power in the area we call QRPp, or milliwatting. It is a captivating pursuit that is open to personal expression. It is low in cost, terrific fun, and also the main focus of this month's column.

A good way to get started in milliwatting is by going for the QRP Club International's famous 1,000 Miles Per Watt award (details at <www.qrparci.org> or apply at <qrparciawards@comcast.net>). A 1,000-mile QSO while running 1 watt, a 500-mile QSO while running 500 milliwatts, a 250-mile contact with 250 milliwatts, or even a 50-mile contact while using only 50 milliwatts all qualify for the basic award. After reaching that goal, you can continue on towards setting new miles-per-watt world records, which presently stand at about one- or two-million miles per watt for most amateur bands.

As an alternative, you can just "do your own thing" for personal enjoyment. Recently, for example, Bob Chapman, W9JOP/4, completed his Worked All States award while using a little 250-milliwatt Tuna Tin Two transmitter and G5RV antenna. Now that's an accomplishment with real bragging rights!

Need more encouragement? Maybe our accompanying views and notes will pique your interest.

Photo A– Going for maximum fun at minimum cost, Tom Desaulniers, K4VIZ, recently built a 400-mw Rock Mite mini rig and mounted it vertically on the left side of this 3.5" × 3.5" × 9" box. The box also holds two 6-volt/3-amp gel cells, a small amplified speaker, earbuds, mini paddle, and wire antenna for grab-and-go milliwatting fun. (Photo courtesy of K4VIZ)

Milliwatt Magic

Fellow QRPer Tom Desaulniers, K4VIZ, called recently, bubbling over with exhilaration after working 15 states with a little Rock Mite 40-meter mini transceiver running only 400 milliwatts. We invited Tom to share a photo of his new homebrew delight (photo A), and the accompanying CW paddle immediately caught our attention (photo B). (All QRPers love keys!) The paddle is a trim, hearty little item measuring 1.5 by 3.5 inches and standing (sitting, actually) 1.25 inches tall. Its mechanism consists of two cantilever-type stainless-steel arms mounted on a .25-inch thick strip of Mycarta insulation and fitted with clear rubber feet for fingerpieces. A stainless-steel post between the arms serves as a common/ground post and stop. The base is polished brass with beveled sides, and it is topped with a small nameplate engraved with an owner's call. It is neat, it handles very well, and I understand Tom has also geared up to produce these paddles for other amateurs. You can check them out at <www.vizkey.com> or contact Tom directly at P.O. Box 1026, Leeds, AL 36094 for details.

MPG QRPp

Continuing along the milliwatt trail, QRP aficionado Paul Phillippe, WBØMPG, shows us his easy-to-duplicate flea-power transmitter built from a 1976 article in *73 Magazine* written by Si Dunn, K5JRN (photo C and fig. 1). Paul says the transmitter pumps out a nice 150-milliwatt signal with a 13-volt supply or 40 milliwatts with a 9-volt battery, and he has worked stations around the country with it and a 40-meter dipole at 35 feet. Impressive!

Looking at the rig's circuit diagram, we see it uses an ever-popular 2N2222 transistor with a 10K-ohm and 3.3K-ohm resistor establishing base bias while a 27-ohm emitter resistor limits overall current consumption. The collector/tank coil (for 40 meters) consists of 17 turns of #24 enameled wire on a $1^1/_4$-inch form (Paul used an old tube base). The antenna pickup coil is three turns of #22 or #24 plastic-insulated hookup wire wound over the

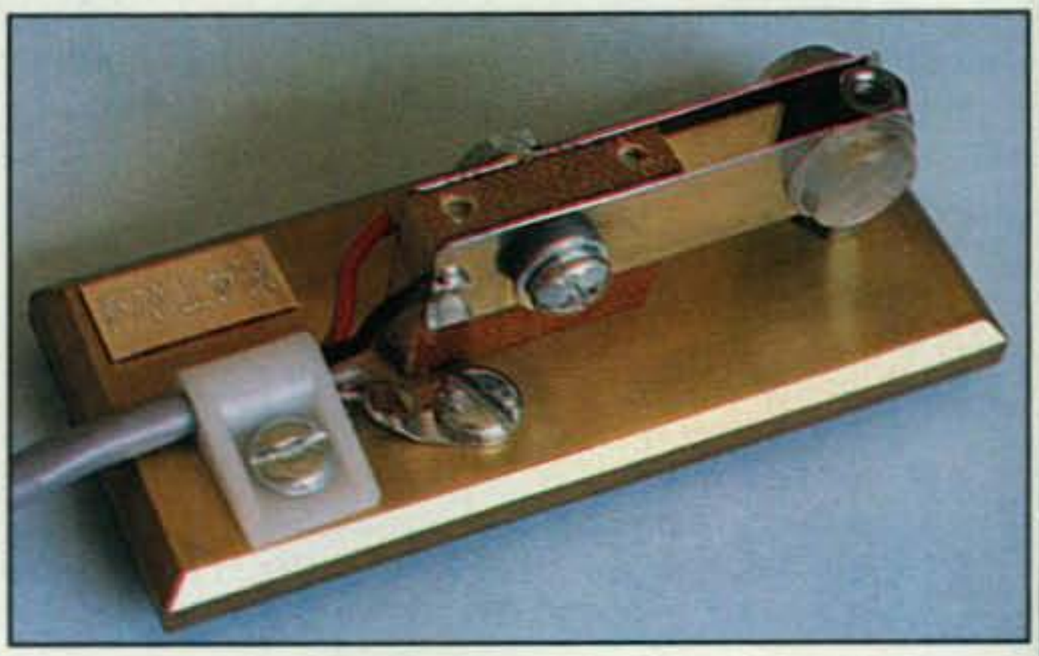

Photo B– A closer look at the mini paddle Tom, K4VIZ, uses with his "lunchbox-case" Rock Mite. Base measures 1.5 × 3.5 inches. It is polished brass with beveled edges and has a nameplate with owner's call, and the mechanism is cantilever-type arms of stainless steel. Nice!

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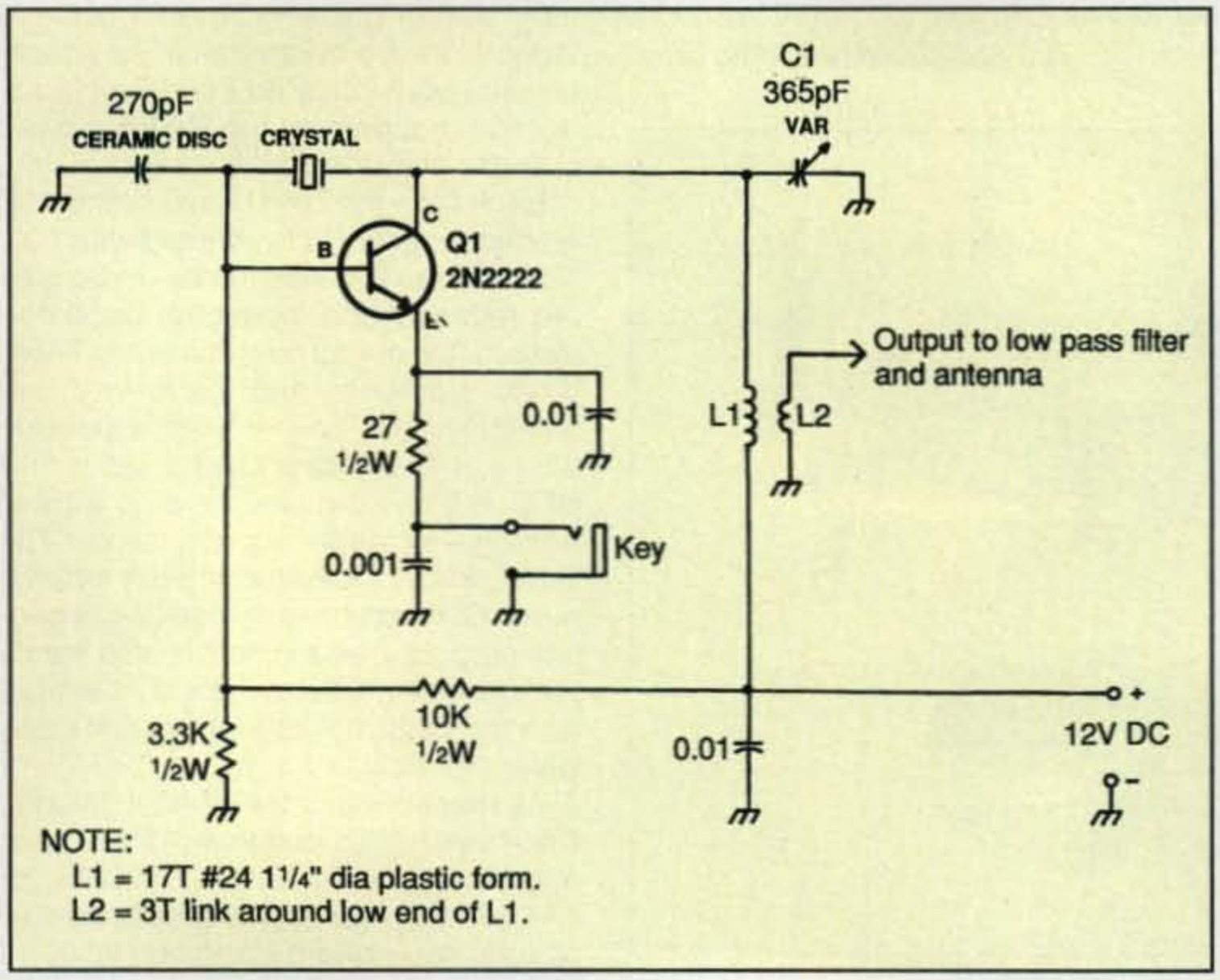
Photo C– Paul Phillippe, WB0MPG, built this neat 150-mw transmitter from an article written by K5JRN and described in a 1976 issue of 73 Magazine. Bill used it to work stations nationwide on 40 meters—proof that milliwatting goes the distance! ⟶



NOTE:
L1 = 17T #24 1¼" dia plastic form.
L2 = 3T link around low end of L1.

Fig. 1– Circuit diagram of the 150-mw transmitter built by WB0MPG. (Details in text.)

collector coil. The tuning capacitor is a small plastic-encased 365-pFd item like that used in a transistor radio. It is adjusted for the cleanest sounding signal consistent with high output.

Incidentally, Paul is a fascinating chap and one we consider a true advocate of QRP. He has approximately 25 QRP rigs and a collection of classic receivers and transmitters he has restored (and uses on the air regularly), and he operates CW exclusively. Paul is so QRP crazy that he even built and kept in its original shipping box the famous little "OX" oscillator kit and "PAX" power-amplifier kits produced by the International Crystal Mfg. Co. of Oklahoma City during the 1960s (photo D). Our hat is off to this outstanding QRPer!

Key-Fob Transceiver

Remember the Hamfest Buddy mini transmitter with wireless receiver BFO function featured in our August 2004 "QRP" column? We continued dinking with the little critter after sending in the column, and by jove, it has now evolved into a one-transistor micro transceiver (photo E). That's right: It is small enough to be a key fob, it actually transmits and receives, and it is also available as a low-cost kit. The wireless BFO function remains intact, so you can still use the Buddy with a simple AM receiver as described in the August column. It is not a super performer (what do you expect for one transistor!), but it fills the bill in ultimate portability. Add a billfold-carried, ultra-fine wire rollup antenna, and you are ready |

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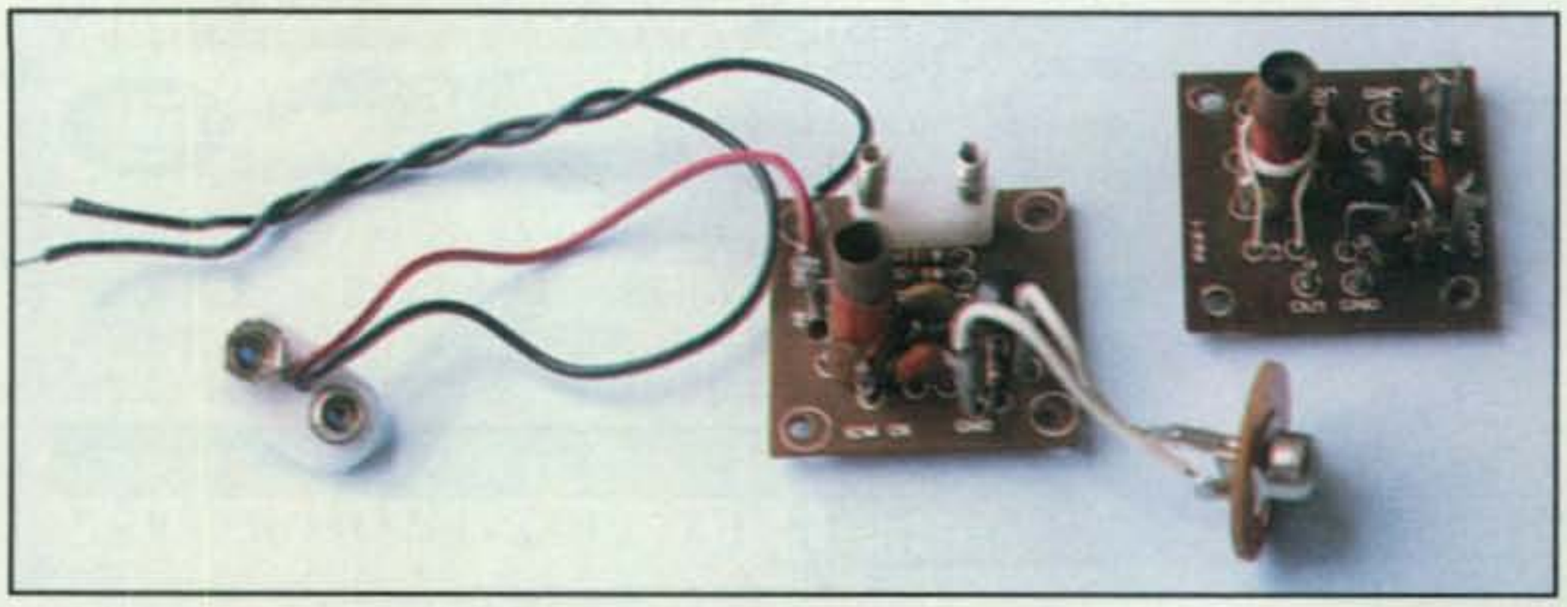


Photo D– These "OX" Oscillator" and "PAX"/RF amplifier kits produced by the International Crystal Mfg. Co. of Oklahoma City during the 1960s and built by Phil, WB0MPG, were some of the first flea-power kits for QRPers. Oscillator produces 10–20 mw, and amplifier boosts that level to 150–200 mw. Total nostalgic bliss!

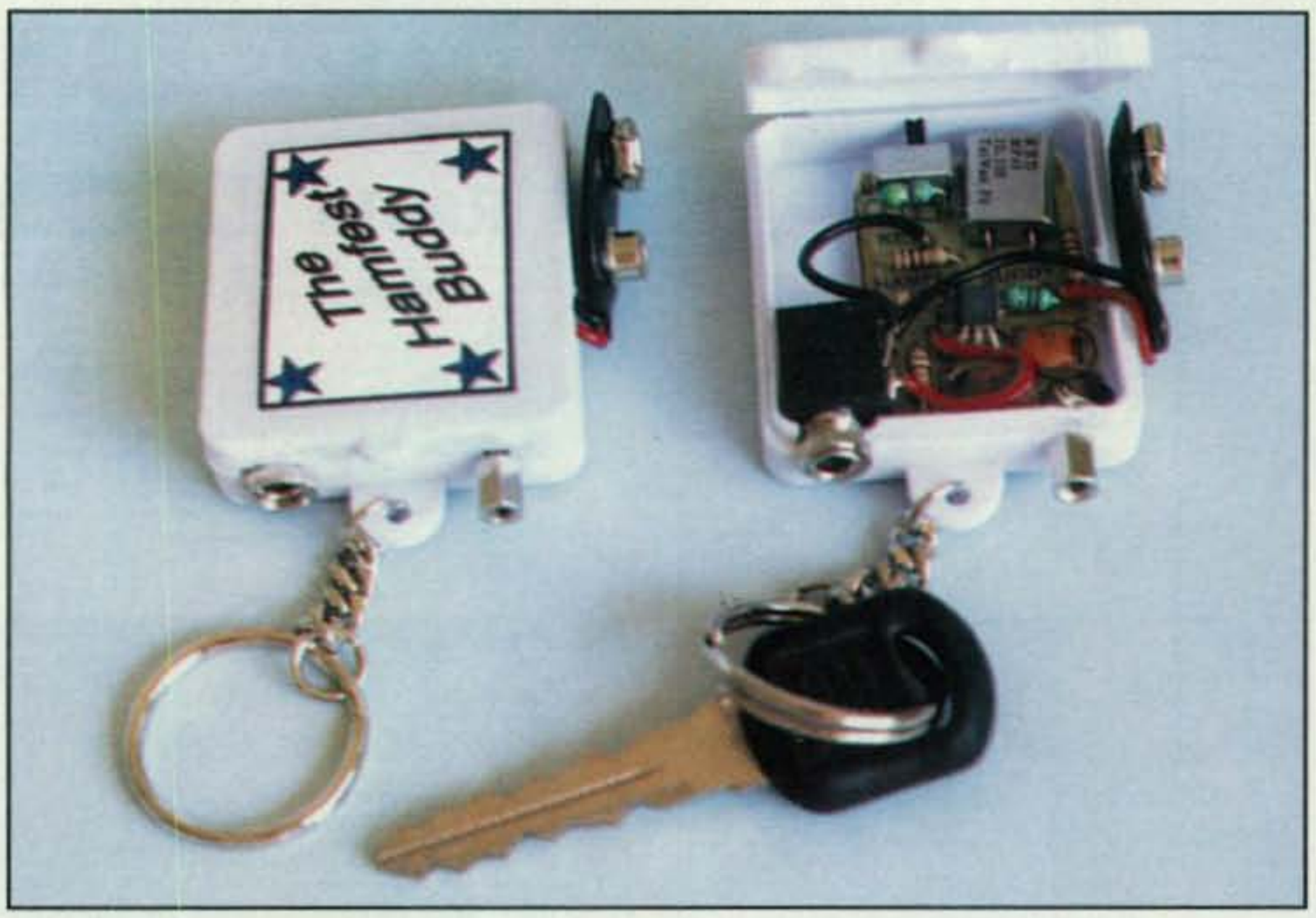


Photo E– Utilizing only 12 components and fitting into a key-chain-size pillbox, our modified Hamfest Buddy may qualify as the world's smallest and simplest CW transceiver. It operates on a regular 9-volt battery, delivers 50–60 mw output, and is available as a low-cost kit for 30, 40, or 20 meters. (Detail in text.)

for fun or emergency operation anywhere and anytime.

I may not be the first person to devise such a simple one-stage transceiver, but all the other designs I have seen use a big multi-pole switch to basically reconfigure the full circuit between transmit and receive. My design features full CW break-in operation, and the only switch used changes the VXO operating frequency.

The Hamfest Buddy's modified circuit diagram is shown in fig. 2, and a streamlined description of its operation follows. Basically, the circuit functions as a one-transistor oscillator with R1 and R2 setting base bias, while R3 sets the key-up power level and R4 sets the key-down power level. The power output is low (50 or 60 mw, typical with a 9-volt battery), so a short dangling wire can serve as a makeshift antenna without concern of transistor meltdown. An output filter should be added, however, if an outdoor antenna is used with the Buddy.

Now take a second look at the circuit and visualize the transistor operating as a bilateral device, producing an output signal at the collector on transmit and an incoming signal at the emitter on receive. When the key is up, current flow is limited to less than 1 ma by the 10K-ohm emitter resistor R3. As a result, the transistor barely conducts and produces a very-low-level BFO signal at the crystal's frequency. Simultaneously, an incoming signal (also at or near the crystal's frequency) proceeds from the antenna (or output filter, if used) to the transistor's collector and progresses across its base. Passive mixer action occurs right at the base, and the resultant direct-converted audio signal develops across the previously mentioned 10K-ohm resistor R3. You can copy this signal by connecting a *very-high-impedance crystal earphone* (not a low-impedance or dynamic earphone) in parallel with the 10K-ohm emitter resistor R3.

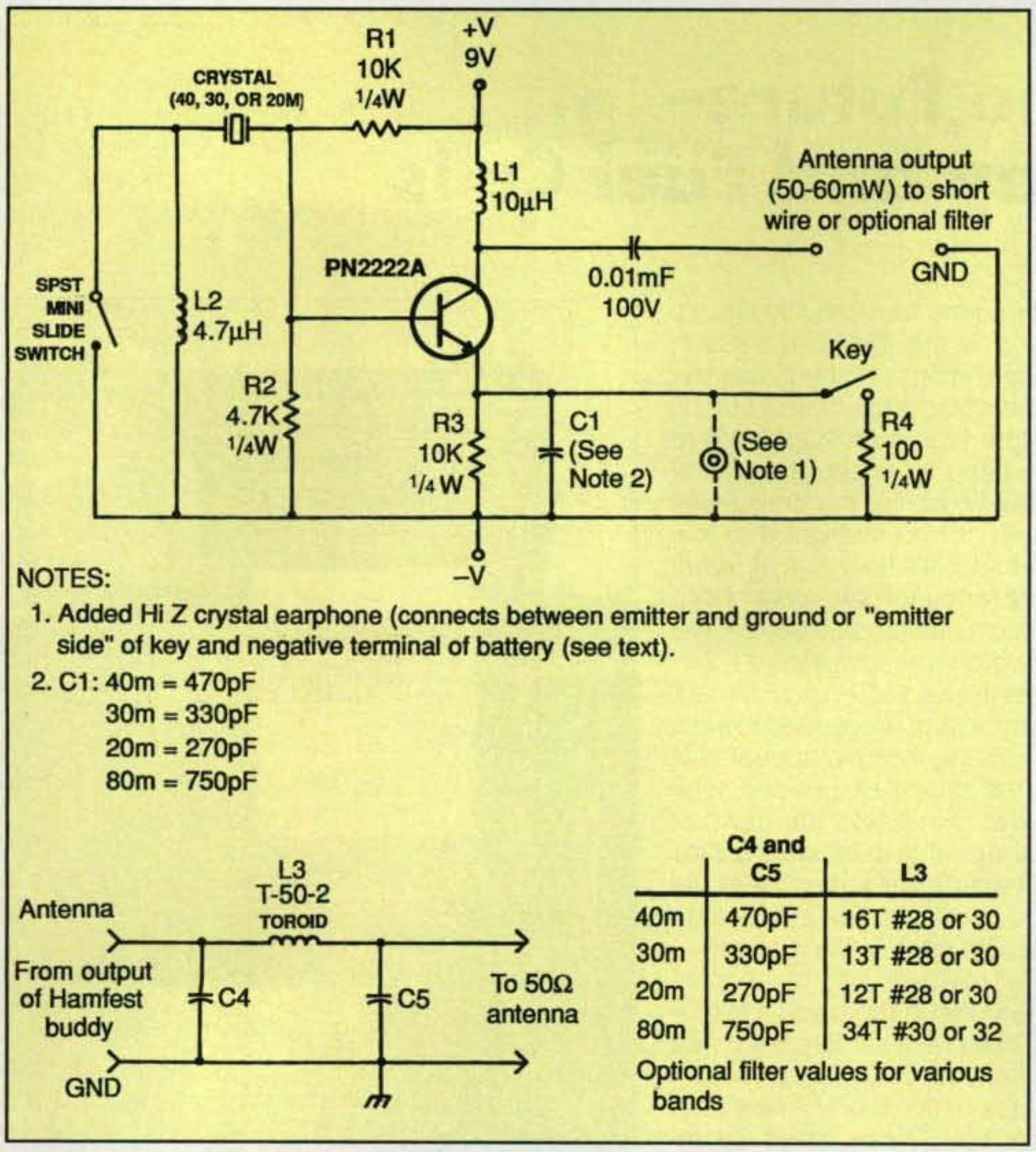
As an alternative, a .01-mFd capacitor can couple the signal to an external amplifier with high-impedance input (1 meg ohm or greater). An FET preamp stage followed by an amplified speaker, etc., could also be used, but in my opinion that defeats the Buddy's basic purpose of a stand-alone/key-chain rig.

Each time the key is closed, the 10K emitter resistor R3 is shunted with 100-ohm resistor R4. This mutes or disables the receiver and increases oscillator/transmitter output to maximum. There is no sidetone, and sensitivity and selectivity are on-par with a passive mixer or shortwave crystal set with a BFO, but it works well for a rig without a stage of audio amplification. The Buddy is ideal for checking out around-motel QRP action at hamfests (its original purpose), and I find it is also handy for short-range "keep in touch" communications with the mobile rig at rest stops while traveling.

As mentioned in the August column, I still have kits complete with PC boards and a crystal for 7.040, 10.106, or 14.060 MHz (specify) available for $16 plus postage and packaging ($2.00). I also have a limited number of earphones and key-fob cases available for original or modified Buddys. Cases are $2.50 and the earphone is $3.50. Drop me an e-mail (k4twj@cq-amateur-radio.com) or postcard *before ordering* to double check availability and I will zip a kit to you pronto. Order direct from me, Dave Ingram, K4TWJ, 4100 S. Oates St. #906, Dothan, AL 36301.

New "KEYS III" CD

While discussing new goodies, incidentally, I am proud to announce that my new *World of Keys* book (CD actually) is now available, and it is a killer (photo F)! The CD contains large, full-color views and descriptions of every key imaginable and unimaginable: Double Polarity Keys, Crickets, Camelbacks, Finned Spark Keys, Rotating, Tilting and Convertible Bugs, McElroy, Martin & Vibroplex Bugs, new keys and paddles, plus much more. I went delightfully overboard on this third work



NOTES:

1. Added Hi Z crystal earphone (connects between emitter and ground or "emitter side" of key and negative terminal of battery (see text).
2. C1: 40m = 470pF
   30m = 330pF
   20m = 270pF
   80m = 750pF

	C4 and C5	L3
40m	470pF	16T #28 or 30
30m	330pF	13T #28 or 30
20m	270pF	12T #28 or 30
80m	750pF	34T #30 or 32

Optional filter values for various bands

Fig. 2– Circuit diagram of the Hamfest Buddy with mild-mannered mod to make it a transceiver. Note the high-impedance crystal earphone connects between thetransistor's emitter and ground—or between one key terminal and the negative terminal of the battery, but not directly across the key. (Discussion in text.)

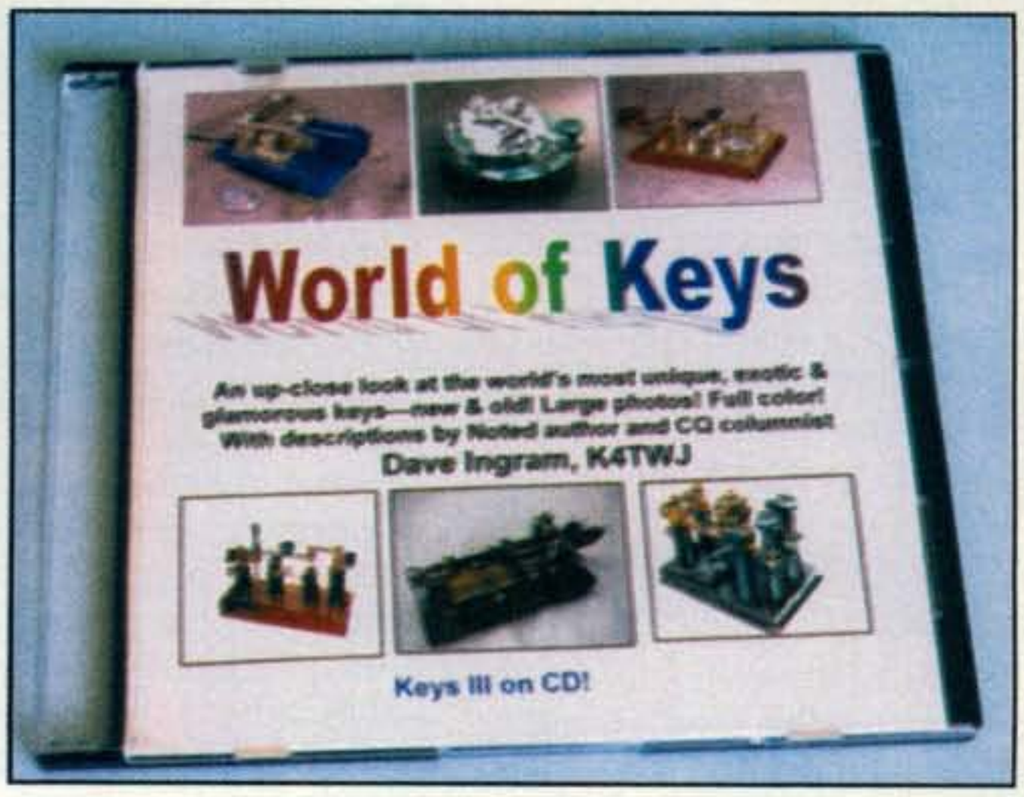


Photo F– Making its grand debut this month is my new "paperless book," the World of Keys *on CD. It displays/presents over 100 large, full-color pictures and descriptions of the most incredible, unique, and exotic keys, bugs, and paddles ever seen. It uses your computer's internet browser to read just like a book. (Details in text.)* ⟶

about keys, and it is wild! Viewing the CD is easy. Just pop it in your computer; it auto starts. Then click on various chapters, click to turn pages, etc., as desired. The CD is $16 plus postage and packing ($2.00) and available direct to you from me, Dave Ingram, at the above listed address. Check it out!

That wraps up the views for this month, gang. Keep on having fun with low power and remember to listen for me weeknights on 30 meters. I will be the weak one running QRP!

73, Dave, K4TWJ

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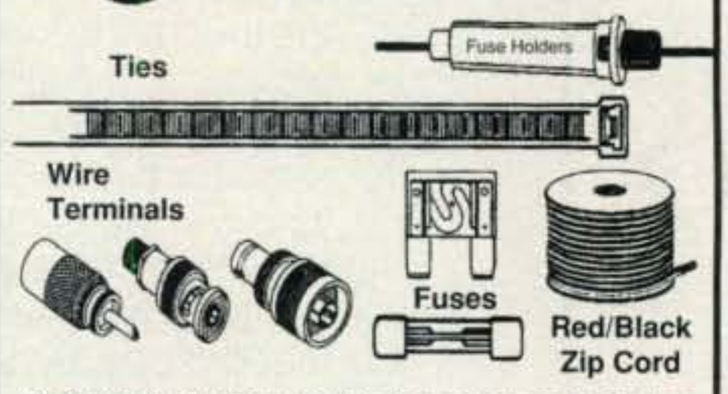

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magic in the sky

BY JEFF REINHARDT,* AA6JR

Meet the Future–Field Day and Fuel Cells

You might recall a scene from the film classic *Butch Cassidy and the Sundance Kid* in which an angry and indignant sheriff was trying to raise a posse that would immediately set out to chase the two desperados, who happened to be watching from across the street. In spite of appealing in every way he could, the crowd was disinterested and could not be motivated to join him. Responding to the sheriff's final plea of "What do you say?" an entrepreneurial salesman chose the moment to introduce a newfangled device, the bicycle, to the already gathered townsfolk.

"I say ... I say ... meet the future!" he proclaimed, as he produced the bicycle and proceeded to extol its advantages over horses. And *his* appeal was something to which the crowd responded. The symbolic back story was that it was the dawn of the 20th century, and the people didn't want to play "cowboy" anymore. That era was fading away (as was the time allotted to the movie's two anti-heroes). The townspeople were looking ahead.

My "meet the future" moment may have come at Field Day 2005, when I first laid eyes on a hydrogen-powered fuel cell that fit in a container the size of a briefcase. In one simple, relatively lightweight package, the Jadoo JBox S100 Rapid Deployment Power System creates safe, clean, silent electrical power from small bottles of hydrogen. This wasn't a "someday" product such as hydrogen (combustion) powered or fuel-cell cars; this functioning unit was sitting on the table in front of me, powering a QRP Field Day station.

The Jadoo JBox Rapid Deployment Power System, a "box of watts" powered by hydrogen. (All photos by the author)

Set 'em up, Joe

We may be some months away from dropping in at the local hardware store or corner gas station and asking for "a Slurpee® and oh yeah, a couple bottles of hydrogen," but that day is closer than it was just a year or two ago. The hydrogen bottles in the JBox were about the same size as those you find in a homeowner's propane torch kit. They also last a long time, which varies according to the load the unit is powering.

Okay, Set 'em up, Rob

Rob Hanson, W6RH, is one of my technical gurus. He's a communications professional with the City of Los Angeles, an excellent technician, and a dedicated ham radio operator who's usually among the first to try new things. Thus, I wasn't completely surprised (but was still amazed) when a few weeks before Field Day he told me, "I'm working on getting us a fuel cell." Sure enough, he convinced the folks at Jadoo Power Systems that Field Day would be an excellent opportunity to showcase the capabilities of their "pocket power plant" (my term, not theirs).

I said to Rob, "Okay, make it work." He said, "It *is* working." We were listening to the ham radio, which was connected to the JBox. I said, "Okay, turn it off." He closed the valve on the hydrogen bottle. I said, "Okay, turn it on." He opened the valve on the hydrogen bottle. Well, I was impressed but felt the moment was a bit anti-climactic. I mean, here's this incredible technology —electrical power being produced from a naturally occurring element, the first one which appeared on the Periodic Table of the Elements that stared back at me through two years of high school chemistry, and all you do to use it is turn a knob? I felt a bit cheated. I was expecting a start sequence and checklist like the one they used for the Apollo

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Does it get any better than this? The next generation of hams operating 15 meters for Field Day station AA6CV from a hydrogen-powered fuel cell. Oh yeah, and there's a pretty good banquet going on in the background!

Suddenly, the old gasoline-powered generator is looking like "old school" technology.

program. This thing has the same start sequence as warming a can of tomato soup. Turn the knob. My "geek gene" felt deprived. No tapping this or adjusting that or wiggling the frammis valve ... turn the knob and it just works.

"After having many questions about how a fuel cell worked, and giving the answer 'mostly magic,'" Rob added, "I learned that the name of the company, Jadoo, actually means magic in Hindi. I guess they have a sense of humor there."

The Real Magic

The power-generating process takes place inside a sealed fuel-cell unit. The only moving part is small fan that apparently forces air through the fuel cell, presumably to ensure a steady supply of oxygen to combine with the hydrogen. The "end products" are electricity and water vapor.

The carrying case of the fuel-cell "generator" has both banana plug and "cigarette lighter" connection sockets. I connected a small 12-volt lamp to the cigarette plug and *voila!* It lit up immediately.

A Field Day First?

I'm going to stick my neck out and claim a "Field Day First" for the Conejo Valley Amateur Radio Club (CVARC) of Thousand Oaks, California, saying we had the first (and ultimate) "natural power" station. To smooth the power flow, Rob connected the fuel cell to a battery, along with solar panels. Come to think of it, with the sun being a hydrogen fusion mechanism, I guess you could say our natural-power station was entirely hydrogen activated. If your club made a contact with AA6CV, you just may have been a part of history!

The Technical Stuff

Rob reports that the hydrogen supply lasted through Field Day. However, even if the fuel had run low, canisters could have been "hot swapped" if continuous power generation was required. No special hydrogen is needed; tanks can be refilled by the system's owner after aquiring a supply of hydrogen gas from a local welding supply house. I'm sure that somewhere down the road as this technology finds its way into consumer devices, some marketing maven will convince us that we need "ultra high-test purified energized hydrogen with the secret added ingredient that adds to your mileage..." but for now, plain old hydrogen will suffice.

The unit we used has a continuous power rating of 45 watts, with a peak rated at 60 watts for up to two minutes at peak and a total run time of 100 amp

Rob Hanson, W6RH, shakes down the fuel-cell "natural power" station.

hours. The spec sheet shows a start-up time of less than five seconds and a projected life of five years. Its operating temperature range is 12–120° F. As fuel-cell technology has progressed, prices have been coming down. Nevertheless, the unit we borrowed has a list price of $6000, a bit steep for the radio hobbyist. However, as stated at the beginning of this column, this is about the future. Before scoffing, stop and think of what you paid for (and what you got with) your first computer.

Real-World Uses

What other uses can you imagine for a suitcase-size fuel cell? I'm sure some of our government's "three-letter agencies" have already conjured up some applications. More down to earth would be backup power that's not perishable like batteries or liquid-petroleum-fueled generators.

Rob and I joked that the JBox is probably not something you'd want to try to carry onto an airplane; we believe the mere appearance of the unit's contents would probably get you a few hours of "attention" in a closed room. *(And most compressed gasses are taboo on commercial aircraft!)* But imagine a "battery booster" for your car that's ready at a moment's notice. Or a home emergency power source that's clean and dependable. Maybe a supply that can replenish your computer's UPS, or a variety of possible camping uses?

"The Future Is Now"

That statement is attributed to the late football coach George Allen. Coach Allen was tired of hearing teams were drafting young, unproven players and building toward some unspecified future time. He inspired some "over the hill" players to their highest levels of achievement by rethinking how a team can win.

As the price of gasoline in my neighborhood approaches $3 per gallon and global warming becomes more of an issue, it's clearly time that *we* re-think power generation. Indeed, the future is now.

I don't know if Jadoo (go to <www.jadoopower.com>) has the ultimate answer, but I'm grateful for its willingness to share and help educate the public. Also, while this may be "golly-wow" to us, take a look at the kids in the photo using the Field Day station. They're proceeding as though this has been the norm for 50 years. After all, this is mostly about *their* future, one in which hydrogen is providing the power behind the "Magic In The Sky." 73, Jeff, AA6JR

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what's new

BY KARL T. THURBER, JR.,* W8FX

Dual-Band Mobile/Base Rig, Mobile Amplifier, Antenna Hanger, and more

This month we'll focus on some noteworthy radio ham shack gear and accessories, as well as antennas and antenna-related accessories—all truly useful stuff. Let's dig right in.

Radio Gear

Alinco Introduces the DR-635T 2M/440-MHz Mobile/Base Transceiver. Alinco has announced a new dual-band mobile/base transceiver, the DR-635T (see photo A). "Built in response to popular demand, this dual-band radio features cross-band repeat, full duplex capability, and a detachable remote-mountable control head," said Russell Dudley, KW5O, President, Ham Distribution, Inc., the North American distributor for Alinco. "It features newly designed RF circuitry for increased resistance to interference from adjacent signals."

The DR-635T also includes a new protection circuit designed to automatically engage when the internal temperature rises while operating in the high-power setting. By automatically changing the power setting, this feature can help protect the radio when it is used for active crossband repeater operation.

Included with the DR-635T is Alinco's popular feature-packed microphone, the EMS-57. Besides basic microphone operation, you can use the backlit keypad to enter frequencies, switch from VFO to memory operation (and back), select the transceiver's call channel, recall SET mode, change operating bands, select the transmitter's power output setting, and temporarily defeat the receiver's squelch setting.

The DR-635T has a large, six-character alphanumeric display with selectable display color illumination, available in blue, violet, or orange. The radio also features 200 memory channels, ignition key on/off and theft alarm features, Continuous Tone Coded Subaudible Squelch (CTCSS), Digital Cross-connect System (DCS) encode/decode, and Dual-Tone Multi-Frequency (DTMF) encode functions, along with European tone bursts. A variety of scan modes and extended receive capabilities are also available.

Similar in style and function to the popular DR-620, the DR-635T shares the ability to operate with Alinco's optional internal packet boards. Digital operators can also order the optional EJ-50U packet board, which fits inside the transceiver. With the board installed, 1200- or 9600-bps packet operation can be achieved by connecting a computer to the rear panel port that comes with the optional EJ-50U.

For more information and pricing, contact Alinco through its North American distributor, Ham Distribution, Inc., 15 South Trade Center Pkwy., Conroe, TX 77385 (phone 936-271-3366; e-mail: <alinco@consolidated.net>; and on the web: <http://www.alinco.com>).

Ameritron 500-watt Mobile Amplifier with Remote Head. New from Ameritron is the 500-watt Solid-State Mobile Amplifier, now with a remote head (photos B and C). Ameritron's ALS-500M, priced at $849, is a solid-state amp that gives you 500 watts PEP SSB or 400 watts CW output. It's designed so you just turn it on and operate; there's no warm-up and no tuning required, and it boasts instant bandswitching. Its super-compact size lets it fit in very small spaces in your vehicle.

Typically, 60–70 watts in yields full power output; the on/off switch bypasses the amplifier for "barefoot" operation, and an extremely quiet fan comes on as needed. The ALS-500M has excellent harmonic suppression, push-pull output, and a DC current meter. It covers 1.5–22 MHz (10/12 meters with a $29.95 kit). The 7-lb. amplifier uses 13 VDC @ 80 amps.

The ALS-500RC Remote Head, at $49, lets you mount the ALS-500M amplifier anywhere, and it gives you full control of the amp, with power, transmit, and overload LEDs. RJ-45 cables connect the amplifier and remote head.

To order, check various combination pricing details, get a free catalog, or find the name of your nearest dealer, contact Ameritron, 116 Willow Road, Starkville, MS 39759 (1-800-713-3550; e-mail: <ameritron@ameritron.com>; web: <http://www.ameritron.com>).

Accessories for the Shack

Two High-Tech Introductions from AOR U.S.A. Many operators have expressed the desire to

*289 Poplar Drive, Millbrook, AL 35054-1674
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Photo A– The Alinco DR-635T Mobile/Base Transceiver is a dual-band, 2M/440-MHz radio that features cross-band repeat, full-duplex capability, and a detachable remote-mountable control head. (Photo courtesy of Alinco)

Photo B– New from Ameritron is the 500-watt Solid-State Mobile Amplifier, Model ALS-500M, which gives you 500 watts PEP SSB or 400 watts CW output. Just turn it on and operate; there's no warm-up and no tuning, and it boasts instant bandswitching. (Photo courtesy of Ameritron)

Photo C– The Ameritron ALS-500RC Remote Head lets you mount the ALS-500M amplifier anywhere in your vehicle and gives you full control. Power, transmit, and overload LEDs are featured. (Photo courtesy of Ameritron)

experience the excitement and clarity offered by digital operation. First up this month from AOR is the new ARD9000 Digital Voice Modem (photo D), designed to make digital voice HF contacts easier and more affordable. As Takashi "Taka" Nakayama, KW6I, Executive Vice President of AOR USA, Inc., explains, "AOR has responded to customer requests by creating a more compact and economical unit designed exclusively for digital voice. As with our ARD9800 fast digital modem, it works with *any* existing transceiver without requiring any modifications."

Using the open G4GUO protocol, the ARD9000 and ARD9800 units are compatible with one another, and both automatically detect digital signals and decode them while allowing analog signals to pass through. With both units, full analog capabilities are maintained while enabling digital contacts. Background static and noise are virtually nonexistent in the digital mode, prompting users to comment that the audio quality is like a telephone.

KW6I also notes that a growing number of amateur radio operators in the U.S., Japan, and Europe already enjoy high-quality digital audio with the ARD9800, and they have reported numerous successful trans-Pacific and trans-Atlantic digital voice contacts. Operators of ARD9000 and ARD9800 units can arrange digital QSOs through links found on several independent websites or through hot links on the AOR website.

MSRP for the new ARD9000 is $339 USD. Special discounts are available for volume purchases made through ham radio clubs; contact AOR for details.

Next up from AOR is the new SR2000 Frequency Monitor (photo E), an ultra-fast, professional spectrum display monitor with a high-quality triple-conversion receiver. The unit puts the power of FFT (Fast Fourier Transform) algorithms to work in combination with a powerful receiver that covers 25 MHz to 3 GHz continuously. Featuring a full-color spectrum display, the SR2000 instantly detects, captures, and displays transmitted signals. It is extremely sensitive, amazingly fast, and easy to use.

"The SR2000 Frequency Monitor was designed and built with the monitoring professional in mind," said AOR's "Taka" Nakayama, KW6I. "With its professional-grade triple-conversion receiver, the SR2000 delivers amazing stability over a wide temperature range. The specially designed circuitry enables high linearity and clean IF output signal."

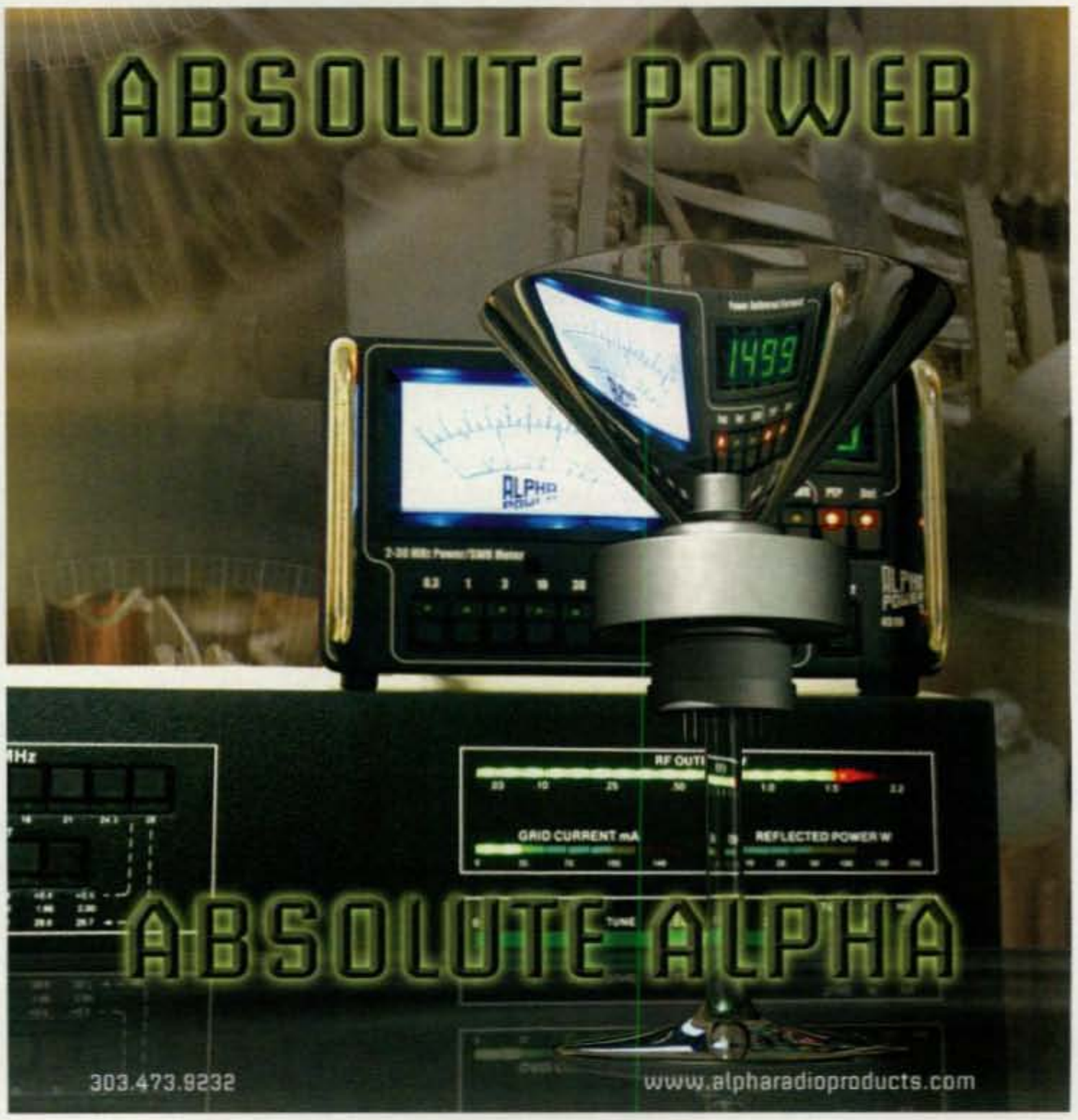

Photo D– The new ARD9000 Digital Voice Modem from AOR is designed to make digital voice HF contacts easier and more affordable. Check out the details in this month's column. (Photo courtesy of AOR)

Photo E– The SR2000 Frequency Monitor is a professional spectrum display monitor with a high-quality, triple-conversion receiver. The unit puts the power of FFT algorithms to work in combination with a powerful receiver covering 25 MHz to 3 GHz continuously. (Photo courtesy of AOR)

Using a built-in 5-inch Thin Film Transistor (TFT) color display, the SR2000 offers a "waterfall" display function that tracks signals over time and uses colors to define their strength. With advanced digital signal processing, the SR2000 can display up to 10 MHz of bandwidth in real time. The SR2000 covers AM, NFM, WFM, and SFM modes and uses digitally processed IF signals of the RF unit combined with FFT technology to enable spectrum analysis and high-speed signal detection in real time.

The keys and single control dial on the front panel of the SR2000 Frequency Monitor enable maximum versatility and simple operation. Monitored frequency and audio gain can be adjusted simply by using the main control dial. The SR2000 features 1000 memory channels and 40 search bank memories; these can easily be set up to suit your own individual monitoring requirements.

Said to be perfect for base, mobile, or field use, it also can be used with a PC. Adds KW6I, "The SR2000 is designed for professional users, such as governments, military applications, law enforcement, laboratories, and others who require the ultimate in a sensitive, wide-range frequency monitor."

Photo F– The Maxsell Ham Radio Timepiece gives you instant recognition among ham radio operators. The watches are available in both women's and men's sizes, as well as in your choice of wristbands. The alligator leather wristband is shown here. (Photo courtesy of Maxsell)

For more information, contact AOR U.S.A., Inc., 20655 S. Western Ave., Suite 112, Torrance, CA 90501 (phone 310-787-8615; e-mail: <info@aorusa.com>; on the web: <http://www.aorusa.com>).

Ham Radio Operator Timepieces from Maxsell. Several months ago we profiled the attractive, custom-engraved ham radio operator badge offered by Maxsell. Due in large measure to the favorable response to the badge, Maxsell has introduced the Ham Radio Timepiece (photo F).

Billed as a "magnificent award for club activities or as a cherished special occasion gift," the fine-quality timepiece gives you instant recognition in the family of ham radio operators. The watches are available in both women's and men's sizes, as well as your choice of wristbands. The watches have an imported movement, gold plating, and a sweep-second hand. All watches come with a manufacturer's lifetime warranty certificate.

The attractive, alligator-leather band watch (as shown in photo F) is priced at $29, while the gold dress-band watch is $39. You can even add your own callsign to the watch for $6.

For more information, including shipping details, contact Maxsell Corporation, 4400 W. Hillsboro Blvd., Suite 2, Coconut Creek, FL 33073 (1-877-332-2343; e-mail: <sales@maxsell.com>; on the web: <http://www.maxsell.com>). The company ships worldwide, and it also welcomes dealer inquiries.

Antennas and Antenna Accessories

Ten-Tec Model 3003 Acro-Bat Antenna Hanger. New from Ten-Tec, the Acro-Bat Antenna Hanger (photos G and H) is constructed from UV-resistant, high-stability Trirex® polycarbonate plastic to endure years of outdoor use. This virtually unbreakable plastic is the same as that used by electric companies for covering outdoor electric power meters. All hardware included with the Acro-Bat is stainless steel for rust inhibition.

You can use the Acro-Bat to suspend either a ladderline-fed or small-gauge RG-58 or RG-8X coax-fed wire antenna. The Acro-Bat also will accommodate ladder line itself to be used as antenna wire. Pegs internal to the Acro-Bat hold the

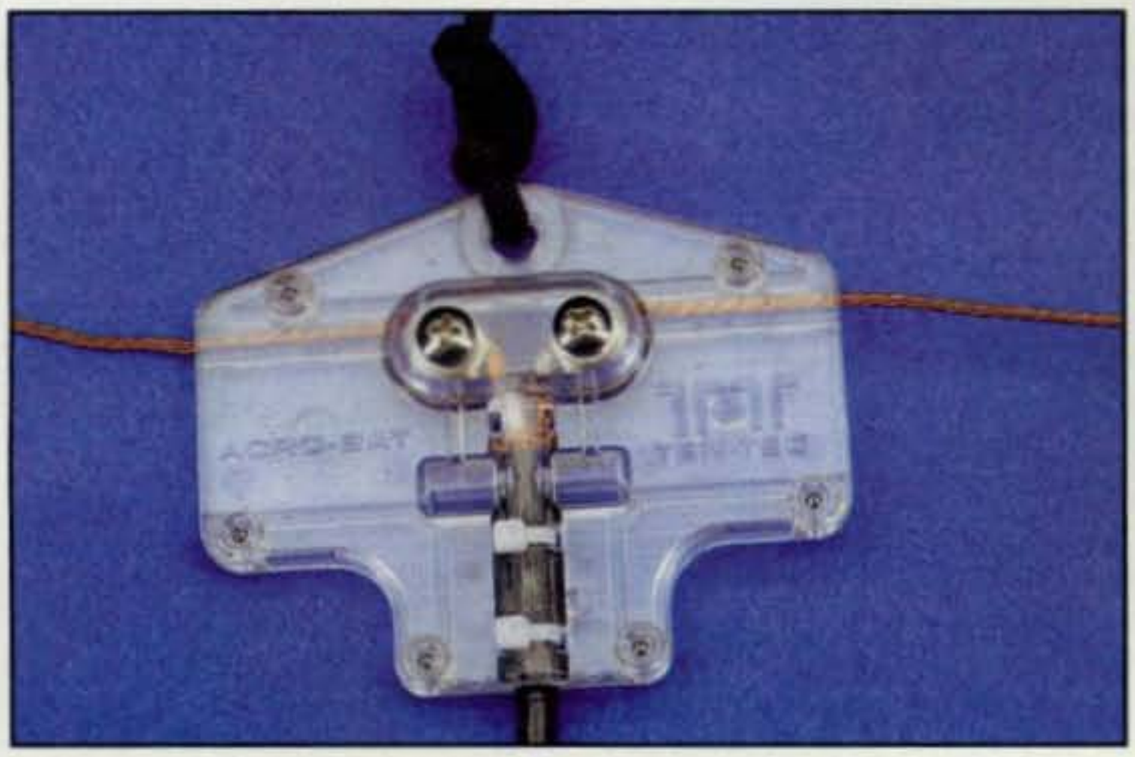

Photo G– The Ten-Tec Acro-Bat is made of UV resistant, high-stability Trirex® polycarbonate plastic to endure years of outdoor use. It's shown here buttoned-up with stranded antenna wire. (Photo courtesy of Ten-Tec)

Photo H– You can use the Acro-Bat to suspend either a ladder line-fed or a small-gauge RG-58 or RG-8X coax-fed wire antenna. It will also accommodate ladderline to be used as antenna wire. Internal pegs hold the ladderline securely in place, as shown here. (Photo courtesy of Ten-Tec)

ladder line securely in place. Internal screw connections allow solid clamping of the wire antenna to the coax or ladder line feedline itself; no direct soldering of ladder line or coax feedline to a wire antenna is needed (although ladderline feed to ladderline used for the antenna wire may require this).

Simply attach wire and coax to the screw terminals, clamp the two sides of the Acro-Bat together, and you're ready to hoist your antenna. A large hole at the top of the Acro-Bat allows easy hoisting of wire antennas by rope. Sealant (not included) can be applied internally or externally for weather-proofing if desired. The Acro-Bat is modestly priced at $9.95.

For more information, contact Ten-Tec, Inc., 1185 Dolly Parton Parkway, Sevierville, TN 37862 (1-800-833-7373; e-mail: <sales@tentec.com>; on the web: <http://www.tentec.com>); or go directly to <http://radio.tentec.com/Amateur/Accessories/TT3003> for info on the Acro-Bat. You can click a link on the website to read the Acro-Bat man-

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MFJ-933 Loop Tuner, Jr. New from MFJ is the MFJ-933 Small High-Efficiency Loop Tuner, Jr., MFJ-933, priced at $179.95 (photo I). Drape a wire around a bookcase and attach both ends to this new tuner, and it instantly turns into a small, high-efficiency, multi-band transmitting loop antenna!

With it you can operate 3.5 to 30 MHz with a full 150 watts; reportedly no ground, radials, or counterpoises are needed. With the MFJ-933 you can tune any shape loop—circle, square, rectangle, or any odd shape—although a quarter-wavelength wire shaped as a circle is said by MFJ to be the most efficient.

The lightweight (3 lb.) unit reportedly is great for apartments, hotel/motel rooms, antenna-restricted sites, and portable locations. You can take the tuner with you and have it operating in minutes from nearly anywhere—on trips, vacations, DXpeditions, camping, or even from a motor home. An easy-carry handle permits easy handling to and from portable locations.

At the heart of the Loop Tuner is an MFJ low-loss butterfly loop tuning capacitor with no rotating contacts (available separately as MFJ-19, for $69.95). Also available is a larger low-loss butterfly loop tuning capacitor (MFJ-23, $89.95). The MFJ-933 also has a detachable mount for a "PVC Cross." Available separately, the MFJ-57B or MFJ-58B PVC Cross Loop Antenna Kits can be used to make compact self-contained antenna systems requiring no ground, radials, or counterpoises.

To order the MFJ-933 Loop Tuner, obtain a free catalog, or find the name of your nearest MFJ dealer, contact MFJ Enterprises, Inc., 300 Industrial Park Rd., Starkville, MS 39759 (phone 1-800-647-1800; e-mail: <mfj@mfjenterprises.com>; on the web: <http://www.mfjenterprises.com>).

PowerMaster from Array Solutions. The PowerMaster (photo J) is a brand-new Digital VSWR and Wattmeter that's outstanding in functionality and accuracy. Jay Terleski, WXØB, Array Solutions proprietor, believes the PowerMaster should set a new standard for what a great, affordable digital VSWR/wattmeter should be.

The PowerMaster is reported to have many more functions then those found in any meter on the market as a stand-alone meter, and the new software features being implemented are impressive. The new unit's RS-232 port allows the providing of real-time data updates to a PC, enabling an optimized, computer-enhanced, feature-rich power monitoring environment for the user.

The digital VSWR and wattmeter features a large Vacuum Fluorescent Display (VFD), a separate RF sensor, several modes of operation, and useful alarm functions that aid in monitoring

Photo I– New from MFJ is the MFJ-933 Small High Efficiency Loop Tuner, Jr. Drape a wire around a bookcase and attach both ends to this new MFJ tuner, and it instantly turns into a small, high-efficiency multi-band transmitting loop antenna. (Photo courtesy of MFJ)

New book from the publishers of CQ Amateur Radio

MIL SPEC RADIO GEAR

KOREAN WAR TO PRESENT DAY

by MARK FRANCIS, KIØPF

ONLY $27.95 $5.00 S&H

- Detailed write-ups for many familiar sets: PRC-25/-77, PRC-10, PRC-74, PRC-41, RT-68, PRC-1099, GRC-106, GRC-9, GRC-109, GRR-5, R-392, and more
- Over 230 pages of operation, modification, and maintenance tips and info, including 200+ illustrations
- HF Manpack, HF Mobile, HF Fixed, VHF Manpack, VHF Mobile, UHF Manpack
- Ancillary equipment: Hand-crank generators, GRA-71 code burst adapter, audio accessories, and more
- Many useful hints and mods gathered from the author's personal experience you won't find in the tech manuals.

A few examples:

- Definitive cure for the PRC-1099 synthesizer FMing problem
- How to turn the power down on your GRC-106 so you don't fry it
- A simple way to adjust the transmit deviation on the FM GRC gear

CQ Communications, Inc.
25 Newbridge Road, Hicksville, New York 11801
Phone: (516) 681-2922 • Fax: (516) 681-2926
Web Site www.cq-amateur-radio.com

On The Cover

On this month's cover is Mike Samarco, W1JZ, of Upton, Massachusetts, enjoying the great outdoors and using an MFJ 259 antenna analyzer to adjust his shunt-fed tower's matching network to 50 ohms. The tower serves as a vertical antenna for 160 and 80 meters and supports a KLM KT-34XA triband beam for 20, 15 and 10 meters, above a 2-element 40-meter Cushcraft Yagi. At the bottom of the tower are 17,000 feet of ground radials.

Mike has been a ham for about 50 years and most of his shack is devoted to his large collection of vintage equipment (pictured on this page), some of which he's had to sell since retiring. He says he's kept his Collins gear, though, consisting mostly of 1950s-era radios, such as 75A Is, IIs, IIIs and IVs, which he says he couldn't afford as a kid and he won't sell them now. The large cabinet in the corner (in the center of the photo) is a homebrew transmitter built to look like a Collins KW-1. Sitting on top of it are an antenna tuner and a wattmeter.

Mike also has an ICOM IC-756 Pro II transceiver and Alpha amplifier, which he uses primarily to chase DX on 160 meters, where he says he needs only three more zones to qualify for CQ's 160-meter Worked All Zones (WAZ) award. *(By Dan Moseson, KC2OOM, Editorial Intern; Cover Photo by Larry Mulvehill, WB2ZPI)*

Photo J– The high-tech Array Solutions PowerMaster Digital VSWR and Wattmeter features a large Vacuum Fluorescent Display (VFD), separate RF sensor, several modes of operation, and alarm functions that aid in monitoring antenna system performance. (Photo courtesy of Array Solutions)

both antenna system performance and amplifier or exciter output for maximum safe performance. There are separate display and coupler/sensor enclosures, and the sensor may be remotely located. Claimed accuracy is within 5 percent from 1.8 to 54 MHz.

The PowerMaster is FCC and CE certified. As such, it will not radiate RF, and it is designed to the highest industry standards for reliability and EMP (surge) immunity. Introductory prices are set for $350 and $450 for the 3-KW and 10-KW versions, respectively. There are two versions of the software available, Lite and Pro, and Array Solutions is willing to customize the software for commercial and military customers.

For details on the PowerMaster, or to place an order, contact Array Solutions, 350 Gloria Rd., Sunnyvale, TX 75182 (phone 972-203-2008; e-mail: <wx0b@arraysolutions.com>; on the web: <http://www.arraysolutions.com>).

***Note:** Listings in "What's New" are not product reviews and do not constitute a product endorsement by CQ or the column editor. Information in this column is primarily provided by manufacturers/vendors and has not necessarily been independently verified. The purpose of this column is to inform readers about new products in the marketplace. We encourage you to do additional research on products of interest to you.*

Wrap-Up

That's all for this time, gang. Next time more "What's New." See you then.

Overheard: It's often said that one should always hope for the best, but also be prepared for the worst—just in case.

73, Karl, W8FX

ATTENTION DRAKE OWNERS!
Does your Drake drift? Tired of continually retuning?

Then You Need this External VFO!

The brainchild of Don Jackson, K5ATW, and Roger Bankston, W5IAB, these new **RB7500-series** DDS (Direct Digital Synthesizer) VFOs will **put an end to your Drake's drifting problems.** These devices employ a Zilog EZ80F91 CPU @ 50 MHz, and an Analog Devices AD9851 DDS chip to deliver a high-stability replacement for the signal from the rig's internal PTO.

Highlights include a smooth spinning shaft encoder with 1000 steps/revolution, selectable tuning rates of 1 kHz, 10 kHz, or 100 kHz per revolution, and a heavy solid cast aluminum tuning knob that delivers a *truly* professional feel. **Installation is as easy as "plug in and play!"** These **RB7500-series DDS VFOs** provide state-of-the-art frequency stability for your classic Drake gear!

- **Dual VFOs with TX/RX/Transceive/Split***
- **4-Line Backlit LCD Display**
- **TCXO Reference with 2.5 ppm Stability**
- **6 5/8" W x 4 1/8" H x 6 1/4" D**
- **AC Power Adapter & Interconnect Cable Included**

Prices:
RB7500 (for the Drake TR-7): **$475**
RB7501 (for the Drake TR-7, TR-7A, R-7 and TR-4310): **$500**
RB7510 (for the Drake TR-4): **$475 NEW!**
Plus Shipping and Insurance.

*Transmit capabilities are unavailable on the R-7.

Announcing the RB5000 Calibrator, a highly accurate TCXO-based Marker Generator for any brand of Vintage, Classic or Contemporary Gear

Place one of these at your operating position, and you'll always be able to determine your operating frequency with *precision*!

The **RB5000 Calibrator** is a very simple piece of test equipment that's just what the doctor ordered **for checking the accuracy of the frequency display – be it analog *or* digital – of *any* HF radio receiver** (or the receiver section within a transceiver). It generates calibration "marker" signals from 25 kHz to well over 100 MHz.

A TCXO (Temperature Compensated Crystal Oscillator) and frequency divider chain provides harmonic-rich switch-selectable calibration signals at 500, 250, 100, 50 or 25 kHz spacings. The frequency accuracy is 2.5 ppm (±9 Hz at 3.5 MHz; ±75 Hz at 30 MHz). Even if your vintage/classic receiver already *has* a built-in marker generator, it's no match for the precision of the RB5000.

No "hook up" is required! A short wire "antenna" is connected to the **RB5000 Calibrator's** RF output and is positioned to couple the signal to the receiver. Powered from 5 "AA" batteries (included).

Price: RB5000 Calibrator: $69.95
Plus Shipping and Insurance.

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(214) 995-9691 • Mon - Fri 9 AM - 5 PM Central • e-mail: navaids@tstar.net

dx

BY CARL SMITH,* N4AA

Christmas Isl. & Cocos Keeling

Well, here it is late summer, or is it early fall? Whichever you wish to call it, the year is moving on. If you are like me, you haven't done nearly all that you had intended to do this summer to get ready for the upcoming operating season. . . . You know, putting up that new vertical for 80 and/or 160 meters, laying more radials under what you already have, tweaking the beams for a few more "ounces," and whatever else you wanted to get done to make ham radio more fun. Ah, yes . . . those good intentions and not enough time. We'll just have to make do for a while yet and hope we can get a little more done before something "big" happens.

Speaking of big, a few "big" things are happening in the September/October time period. The Kure DXpedition should be going on as you read this. This will be followed in the October/November period by the French operation from Glorioso. Also, remember to look for Charlie, WØYG, operating on the low bands from Christmas Island and Cocos Keeling. He shared some of his plans with me, and I'll pass that along for you this month:

I will leave Denver on October 15, 2005, connecting through Los Angeles and going on to Sydney, Australia, to arrive there on October 17. I will meet up with David Burger, VK2CZ, who is going to the island with me (or with whom I'm going to the island!). I will also meet with Bernd, VK2IA. We will discuss what last-minute arrangements need to be made for Christmas and Cocos, as Bernd arrives on Cocos the day I leave.

After leaving Sydney on October 19, I will travel on to Perth to visit with Steve Ireland, VK6VZ. Steve has helped me a tremendous amount with logistics and arrangements over the years. I always look forward to nice visits with Steve and his family. During my stay with Steve, I will have a chance to pack and repack, as the maximum allowance for luggage is 20 kg with 5 kg carry-on. This is not much, so I have had to ship all my antennas ahead of time to Christmas Island. Getting them from Christmas to Cocos will be another story!

I plan to have a Force 12 160-6Y vertical for 160 meters, a Force 12 80-6Y vertical for 80 meters, and a Force 12 Sigma 40XK for 40 through 10 meters, as well as David Burger's five-element monobanders for 20 and 15 meters, which are on Christmas. I also have 48 feet of fiberglass mast for dipoles/inverted-V antennas, as well as 48 feet of telescoping aluminum mast for whatever. My operation will be primarily on CW and primarily on the low bands. However, some RTTY and SSB will be tended to on 20/15. Christmas Island is highly needed on the low bands in the U.S., as well as RTTY and SSB. While it is rather common in Europe and easily worked from there, I hope to have many of our European friends in the log as well, in hopes I round out needed band countries for them.

I will be on Christmas from October 24 until November 7, when I move over to Cocos for two weeks. I hope to have the Force 12 antennas mentioned in the above paragraph with me, as well as VK2IA's Spiderbeam. When meeting with Bernd in Sydney, he will have a repair kit for me to fix the Spiderbeam, which gave him trouble during last year's CQ WW CW contest.

I am also shipping out 3/4 mile of radial wire to each island for use under the vertical antennas. Lightweight #17 aluminum fence wire can be purchased from Lowe's Hardware in 1/4-mile reels for this purpose.

I will also be using an assortment of receiving antennas for the low bands, as pennant, low dipoles, and perhaps beverages will come into play.

One must remember that in order to have a pretty complete operation, almost everything must be shipped ahead of time. This makes the trip out quite expensive. I have spent as much as $1800 in air freight alone, more than enough for an air ticket to Perth!

All logging will be done on a computer. QSLs go to WØYG direct only, no bureau cards. Please QSL with return postage, green stamp or new IRC. *–WØYG*

Hans, SMØBYD, operated at Special Event Station 8SØHRA in July 2005. (Photo courtesy of Lothar, DL1SBF)

The logo of a new group, the North Carolina DXCC Club, in western North Carolina. There are no formal by-laws, constitution, etc. It's just an informal group that gathers once a month to swap tall tales and enjoy good food and fellowship. It was started by Dave Anderson, K4SV, and a few friends.

*P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

Visit Our Web Site

5 Band WAZ

As of August 1, 2005, 681 stations have attained the 200 zone level and 1463 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:

None

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
WØPGI, 199 (26)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
IK1AOD, 199 (1)
DF3CB, 199 (1)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
SP5DVP, 199 (31 on 40)
W8AEF, 199 (40)
K8RR, 199 (26)
UU5JR, 199 (4)
W8GF, 199 (22)
N4NX, 199 (26)
N4MM, 199 (26)
EA7GF, 199 (1)
WAØQII, 199 (26)
N4PQX, 199 (26)
JA5IU, 199 (2)
N6HR/7, 199 (37)
CT3DL, 199 (26)
NØIJ, 199 (21)
RU3DX, 199 (6)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K5PC, 198 (18, 23)
K4CN, 198 (23, 26)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
N4XR, 198 (22, 27)
OE2LCM, 198 (1, 31)
HA1RW, 198 (1, 31)
WK3N, 198 (23, 24)
HA9RT, 198 (1, 31)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
RX9TX, 198 (2, 6)
F5NBU, 198 (19, 31)

The following have qualified for the basic 5 Band WAZ Award:

K2YEH (153 zones)

****Please note: Cost of the 5 Band WAZ Plaque is $80 ($100 if airmail shipping is requested).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

Charlie has been to Christmas and Cocos Keeling a number of times, and he takes his low-band operating very seriously, which is obvious when looking at all the preparations he has made.

Events for DXers

As I write this in mid-August and look at my calendar of upcoming events for the next few months, I find the W9-DXCC Convention in Chicago on September 18, which is always a good one. Hopefully, I will have seen a number of you there by the time you read this.

Just a few weeks later, on October 1, I'll be in Pigeon Forge, Tennessee at the

The WPX Program

SSB

2940 .....RA1QDP 2941 .....K9UQN

Mixed

1956 .....SV1EOS 1957 .....KA8MCZ

CW: 750 EA2CIN. 1600 HB9DOT.
SSB:1050 IZØBNR. 1400 K9UQN.
Mixed: 2800 K9UQN. 3600 I5RFD. 5050 WA2HZR.

10 Meters: SV1EOS
160 Meters: RA1QDP

So. America:HB9DOT, K9UQN
Europe: RA1QDP
Oceania: K9UQN

Award of Excellence with 160 meter bar: UA9CGL

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KUØA, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KUØA, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101 USA. *Note: WPX will not accept prefixes/calls which have been confirmed by computer-generated electronic means.*

Please Note: As of February 2004, the price of the 160 meter bar for the Award of Excellence is now $6.50.

RADIO WORKS

Antenna Fever

CAROLINA WINDOMS™ - best simple wire antenna yet.
1.5 kW, CW/SSB, low takeoff angle for DX, use your tuner
CW 80 80-10 m, 132' long Make a big signal. $115
CW Short 80 80-10m, 84' long, full performance $135
CW 40 40-10 m, 66' Used to set 2 world records. $105
CW 160 160-10 m. 265' Be heard on 160 and 80 $150
CW 160 Special, 160-10 m, 132' Be on all bands $145
G5RV Plus 80-10 m, 102', with high power current balun $65

NEW CAROLINA WINDOM "LP" series.
"LP" means "Low Profile." Matching transformer and Line Isolator are 1/4 the size of the standard units. Perfect for stealth, emergency, QRP, travel, etc. Full CAROLINA WINDOM performance, low visual impact. 600 watts PEP CW/SSB. Available in most CAROLINA WINDOM versions. Call

SALE 100' or more
RG-8X Premium, 95% braid 18¢
RG-213 Top Quality, 95% 39¢
RG-8X 100' 2 PL 259s installed + strain relief $23.95

Current Baluns

B1-2K+ 1:1 2 kW SSB 80-6 m Current Balun $29.95
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B1-5K+ 1:1 5 kW SSB 160-6 m Precision $39.95
B1-200 1:1 200 W SSB 160-10m "Low Profile" $31.95
Y1-5K+ 1:1 5 kW SSB 160-6 m "YagiBalun" $39.95
B4-2KX 4:1 2 kW SSB 160-10m Precision $56.95
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RFI QUICK FIX™
For really tough RFI and RF feedback problems, you can't beat the new T-4 and T-4G Ultra Line Isolators. It's isolation factor is 50% higher than previous models - far better than expensive imported copies. The T-4G goes even further with it's built-in ground strap for direct line isolator grounding. Before coax enters your shack, stray RFI is shunted directly to ground. Use with Vertical antennas at feed point. To prevent ground loop problems, install two T-4s beweten your transmitter, linear and tuner. Use with any antenna to reduce feed line radiation. This is the RFI BIG GUN.

NEW T-4-500 Line Isolator. $33.95 1/4 the size of the original Line Isolator. 500 watts CW/SSB. Convenient size for home and mobile

All Line Isolators have SO-239 input and output connectors.
T-4 & T-5 160-10 m, 2 kW+, winding Z @ 3.5 MHz > 75K, @ 14 MHz > 50 K
T-4 Same as T-4G but without direct grounding $37.95
T-4G Ultra Line Isolator, max RFI protection $40.95
T-4-500 35k @ 3.5 MHz, 75k @ 14 MHz 500 W $33.95
Check our web site for comparison with other brands. You wont believe the difference. The others don't even come close to this level of isolation.
Ferrite Cores, snap-on, 1-250 MHz 1/4 I.d. $2.50 or 1/2" I.d. $4.50

Wire and Parts
"And, not a dog in the bunch!"

PL-259ST Silver-Teflon, U.S.A. $1.49 or $25 pk of 20
PL-259GT Gold-Teflon, U.S.A. $1.79 or $33 pk of 20
N-200 'N' Silver-Teflon, installs like a PL-259 $3.99
Coax & cable prices are per foot <100'/>100'
ExtraFlex 9096IIA, flexible 9913 type, low loss 67¢/63¢
RG-213 Plus Enhanced, 96%+super quality jacket 49¢/43¢
Super RG-8X 1.5 kW @30 MHz, low loss, double shield 35¢/31¢

RG-8X JUMPERS - PL-259 on each end. Factory made, molded strain relief, top quality coax. 18" double shield - $6.25
18" single shield - $5.50 3' - $6.25 3' double shield - $7
6' - $7 6' double shield - $8 9' - $7.50 100' - $23.95

R1 Rotator 8 conductor (2 x #18, 6 x #24) 50' multiples 24¢
R2 Rotator conductor (2 x #16, 6 x #18) 50' multiples 39¢
#14 HD Stranded, 7-conductor hard-drawn 9¢
#14 FlexWeave 168-strand, bare, for any wire ant. 20¢
#12 FlexWeave 259-strand, excellent for long runs 22¢
450 Ladder Line #16 stranded conductors, poly, 420 Ω 31¢/25¢
450 Ladder Line #14 stranded conductors, poly, 390 Ω 36¢/31¢
Tinned-copper braid, for grounding, 1/2" @ 65¢/ft or 1" @ $1.19/ft
LadderLoc Center insulator for ladder-line $13.50
Weatherproofing Coax Seal, $2.75 STUF, $6 Cold shrink, $7

Pulleys - for antenna support rope. Highest quality, small, lightweight, sailboat type for fibrous rope - for 3/16" rope $14.95 or 5/16" rope $16.95

Antenna Support Line BLACK Dacron, single braid, fungus and sun resistant 3/16" 750# test $10 per 100' $83 - 1000' spool
Kevlar-no stretch .075" dia. 500# test, Dacron jacket 200' spl $18.50

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The WAZ Program

10 Meter SSB

573.....K2YEH

12 Meter SSB

38.....EA8AYV

40 Meter CW

246.....N4BAA

6 Meters

72.....K4MQG

All Band WAZ SSB

8368 .....N8OKE
8369.....W9GD
8370 .....W4EJG
8371 .....EA1TI

Mixed

8369 .....W7XK
8370 .....IZ2ABP
8371 .....JA1HFY
8372.....IT9DAA
8373 .....K7MH

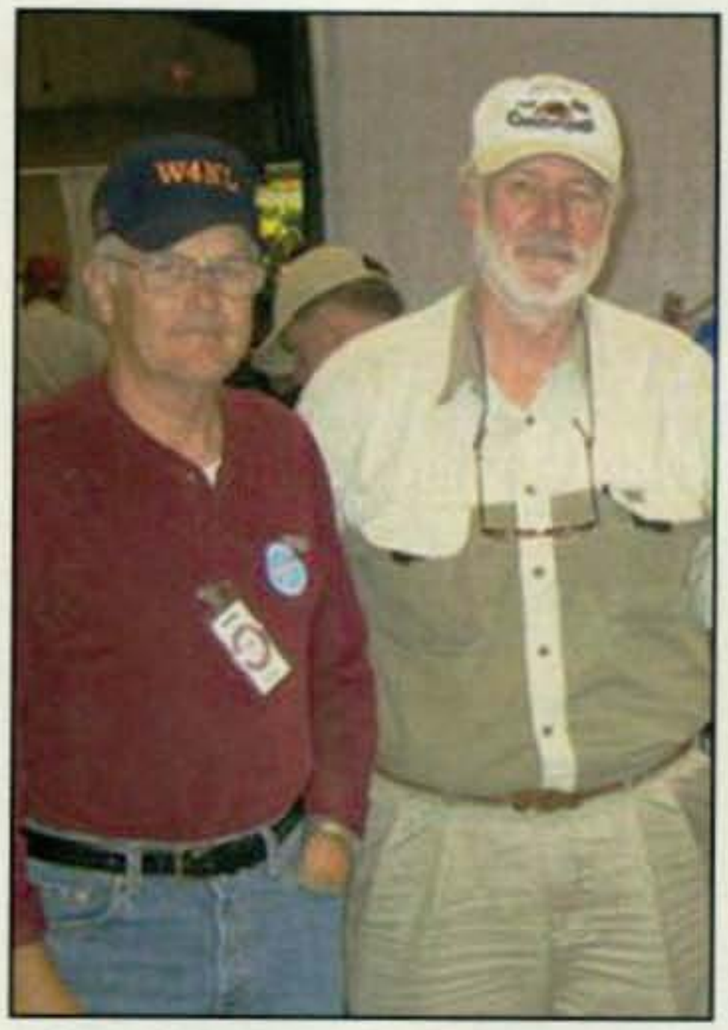
All CW

466 .....JA8AWR
467.....W2RIJ
468 .....IK1SOW

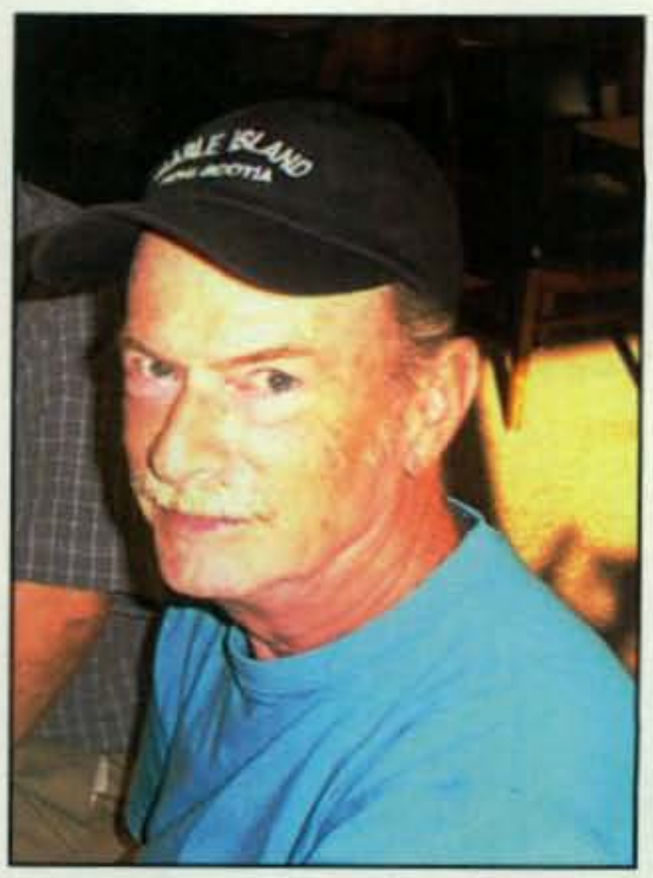
RTTY

160.....IK1SOW

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.



Lynn, W4NL, and Charlie, W0YG, at the Dayton Hamvention® this year. Lynn is one of the organizers of the SEDCO Conference, and Charlie will be active from Christmas Island and Cocos Keeling later this year. (Photo courtesy of Lynn, W4NL)



Phil, W9IXX, at the last NCDXCC club meeting. He had just returned from the Sable Island DXpedition and gave the group a slide show of the trip. (Photo courtesy of Carl, N4AA)

Mainstay Suites. I am honored to have been asked to act as the emcee of the DX portion of the program for the first SEDCO (SouthEastern DX and Contest Organization) conference. There is quite a line-up of program presenters scheduled, including Dave Anderson, K4SV; Ned Swartz, K1GU; Hal Weeden, WB4E/YI9B4E; Bill Tippett, W4ZV; Scott Robbins, W4PA, and his contest station cohort Jeff Yeager, K4JNY; Bob Allphin, K4UEE; Dennis Motschenbacher, K7BV/1; John Almon, WA4JA; and Wes Lamboley, W3WL.

The SEDCO event is being held on the same weekend as the Ten-Tec Hamfest, always a great one with lots of folks attending. This is a wonderful opportunity to enjoy a hamfest and a DX/contest convention in one of the best tourist attraction areas in the country. Pigeon Forge and Gatlinburg make up one of the most visited areas on the east coast. There is a rumor that Tom Christian, VR6TC, may be visiting as he travels around the country, and also Charles, S9SS, is planning on being there. The organizers of SEDCO hope this will become an annual event, and they have worked very hard to make the first one worth remembering. I hope to see a lot of you in the Smokey Mountains for that one.

North Korea, Not a Go

The operation from North Korea back in August didn't work out so well. Dave,

THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix list. Scores are based on the current prefix total, regardless of an operator's all-time count. Honor Roll must be updated annually by addition to, or confirmation of, present total. If no up-date, files will be made inactive.

MIXED

5264 9A2AA	3900 VE3XN	3395 S53EO	2873 W2MF	2457 JN3SAC	1804 KØKG	1560 KX1A	742 K5IC
4719 W2FXA	3938 YU1AB	3332 WB2YQH	2795 9A4W	2426 W6OUL	1773 W7CB	1556 W2OO	648 KWØH
4257 W1CU	3890 I2PJA	3325 KØDEQ	2705 W9IL	2399 K5UR	1741 AB5C	1242 K6UXO	
4241 EA2IA	3703 I2UIY	3191 IK2ILH	2704 K2XF	2142 I2EAY	1705 W2EZ	1016 RA1AOB	
4038 N4NO	3437 I2MQP	2894 W9OP	2518 OZ1ACB	2100 VE6BF	1643 N1KC	825 KL7FAP	

SSB

4583 IØZV	3160 N4NO	2711 LU8ESU	2325 CX6BZ	2038 K5UR	1615 KI7AO	1340 I2EAY	1200 AG4W	805 IK8OZP
3867 I2PJA	3151 I2UIY	2618 OE2EGL	2235 NQ3A	1993 W9IL	1580 DL8AAV	1258 N1KC	1143 EA3EQT	755 VE6BF
3765 F6DZU	3122 CT1AHU	2588 EA1JG	2209 IK2QPR	1830 K3IXD	1480 AB5C	1256 VE7SMP	978 EA7HY	674 K7SAM
3292 EA2IA	3046 I4CSP	2563 KF7RU	2076 K2XF	1716 W6OUL	1458 JN3SAC	1238 LU4DA	934 KX1A	668 AE9DX
3266 I2MQP	2830 4X6DK	2432 IN3QCI	2075 N6FX	1716 W2FKF	1386 IK4HPU	1215 W3LL	851 KU4BP	

CW

4413 WA2HZR	3294 EA2IA	2437 EA7AZA	2093 IK3GER	1907 W9IL	1744 EA7AAW	1227 K6UXO	
4229 K9QVB	2688 I2UIY	2348 I7PXV	2089 K2XF	1863 W6OUL	1362 AC5K	1171 WA2VQV	
3610 N4NO	2632 W2ME	2167 N6FX	1958 VE6BF	1769 I2MQP	1352 WO3Z	1048 KX1A	
3339 VE7DP	2477 KA7T	2120 JN3SAC	1939 K5UR	1767 I2EAY	1334 RUØLL	915 N1KC	

CQ DX Awards Program

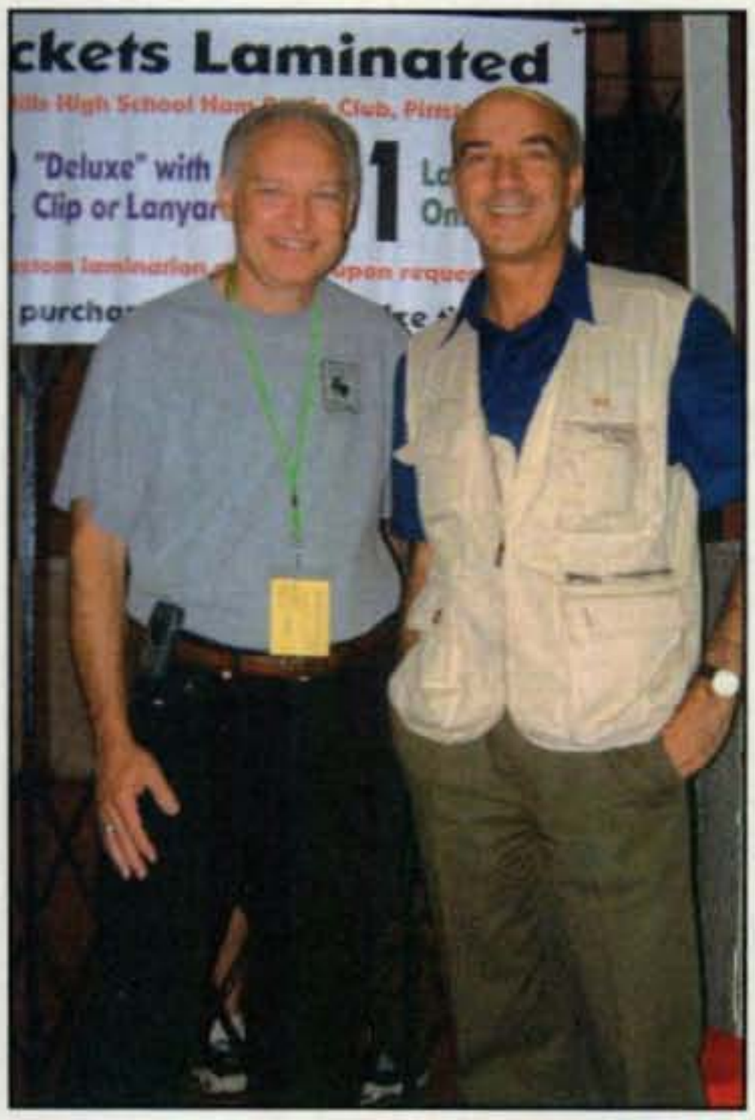
SSB Endorsements

320 .....W6OUL/322 28 MHz VE3NQK
300.....KK4TR/306

CW Endorsements

320.....W6OUL/329 320.....N7WO/323

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 335 active countries. Please make all checks payable to the award manager.



Part of the fun of DXing, and of chasing DX awards, is the occasional opportunity to meet in person someone you've contacted on the radio and who perhaps has helped you toward an award. Here, Dennis Ashworth, K7FL (left), had the opportunity for an "eyeball QSO" a couple of years ago at Dayton with Claudio, ET3VSC (Ethiopia, zone 37), who provided Dennis with his 199th out of 200 zones for the CQ 5-Band Worked All Zones Award . . . on 80 meters long path! Dennis contacted all 40 CQ zones on each of five HF bands using only simple wire antennas. "It can be done without beams and towers," he says. "It just takes a bit longer, a good understanding of propagation, and very patient people on the other end with good ears, like Claudio." (Photo by IT9WPO, courtesy of K7FL)

KA4HTV, had everything lined up, including a good array of equipment/antennas, but was not able to get on the air. Perhaps another time. . . .

Peter I

I would be remiss if I didn't mention the 3YØX DXpedition to Peter I. After being postponed earlier this year, it has been rescheduled for early 2006. The team leaders—Bob Allphin, K4UEE, and Ralph Fedor, KØIR—have spent a lot of time, effort, and money to bring Peter I to us. I wish them good luck and God speed with their new plans for this one.

In Closing . . .

I must also mention those big operating events for October and November, the CQ WW DX SSB and CW contests. They always generate a lot of activity, providing many with new "counters" toward whatever award(s) they are after. Whether you have all weekend or just a few hours, get in there and *have fun!*

Until next time, enjoy the chase.

73, Carl, N4AA

QSL Information

D7ØYT/5 via HL5BDD
D9ØHE/2 via DS2GOO
DAØGLH via DL2VFR
DA1DX via W9NZ
DF5WA/FM via DF5WA
DF7GB/FM via DF7GB
DLØEUF via DL1VU
DLØNBR via DL1WH
DQ80IARU via DFØHQ
DU1/W9NZ via W9NZ
DU2/K7QN via K7QN
DU6/W9NZ via W9NZ
EA6/DL6KAC via DL6KAC
EA6AFF via EC6TV
EA8AH via YL2KL
EA8EW via OH1MA
EA9CP/1 via EA9CP
EA9EU via EA9AZ
ED1VIG via EA1RKV
ED2EFE via EC2AHS
ED2LCC via EA2AWA
ED3DSJ via EA3RCQ
ED4URH via EA4ECY
ED4ZDC via EA4YK
ED6EDC via EA6ZX
ED6FAR via EA6ZX
ED6IDP via EA6AEI
ED8MPJ via EA8BYG
EF8CID via EC8AUA
EF8NAL via EC8AUA
EF8OAL via EC8AUA
EGØRCH via EA4LO
EIØ5CCC via EI5CRC
EKG90GM via EK6GB
EKG90KE via EK6GB
EL2MS via N4KNW
EM1HO via I2PJA
EM2U via UY2UA
EM60IG via UR7IA
EM60QWW via UY5ZZ
EM7J via UUØJM
EM80IARU via UT2UB
EM80Q via US4QWX
EO60G via UR3GM
EO60IS via US7IGF
EO60JS via KD5RBU
EO60MF via URØMM
EO60W via UT7WZ
ER60V via ER1DA
ES6Q via ES5RY
ES70B via ES4OJ
ES70I via ES4RD
ES70J via ES1WN
ES70M via ES1QD
ES70Q via ES5RY
EV60BR via UA3FDX
EV6ZK via UA3FDX
EX/ES1FB via ES1FB
EX/ES1RA via ES1RA
EX8AB via DF9FXK
EZ60V via RW6HS
F/LX9EG/P via LX1NO
FK/F6DLN/P via FK8HZ
FK8HW via VK4FW
FM/DF5WA via DF5WA
FM/DF7GB via DF7GB
FOØ/F8UFT via F5NQL
GØRDK via GØUZP
GB2HQ via GØOOO
GB6WW via MMØDFV
GB8OSJ via G4DFI
GI1W via GIØNWG
GJ60LIB via GJ3XZE
GM6TW via GØUZP
GU/PI9SRS via PA3DHR
GU60LIB via GU3HFN
GW7X via G3SQX
GXØMWT via G3PEM
HBØ/HA5BWW via HA5BWW
HBØ/HA5OJ via HA5OJ
HBØ/HA7PC via HA7PC
HC1MD via K8LJG
HC1MD/HC1 via K8LJG
HC1MD/HC6 via K8LJG
HC1MD/HC7 via K8LJG
HC4/EA9CP via EA9CP
HC8/EA9CP via EA9CP
HF4IARU via SP4GFG
HF70PRT via SP2PI
HF75PZK via SP3IQ
HF9IARU via SQ9ACH
HK3KAV/1 via K7ZD
HR/K6JEN via K6JEN
HR/KB7TX via KB7TX
HR/W7AV via W7AV
HVØA via IKØFVC
HVØHQ pirate

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>.)

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contesting

BY JOHN DORR,* K1AR

What's Your Category?

October's Contest Tip

Given the state of the current solar cycle, it's a great operating strategy to frequently move around the bands. With the exception of unusually good conditions, a big station, or a prime QTH, running time will be a premium for most of us. Also, it will be very likely that the HF- band conditions will be very spotty, making the likelihood of missing a major continental opening quite possible. The bottom line is that you should keep your VFO well-oiled this fall. If you're fortunate enough to have a great run going, keep up the rate. If not, make sure you turn over every rock and find great QSOs/multipliers that others miss. It's just one way to keep you ahead of the crowd.

Calendar of Events

Sept. 24	AGCW VHF/UHF Contest
Sept. 24–25	**CQ WW RTTY DX Contest**
Sept. 24–25	Scandinavian SSB Activity Contest
Sept. 24–25	Texas QSO Party
Oct. 1-2	California QSO Party (CQP)
Oct. 1-2	Oceania SSB DX Contest
Oct. 2	UBA SSB Contest
Oct. 2	RSGB 21/28 MHz SSB Contest
Oct. 5–7	YLRL Anniversary CW Contest
Oct. 8–9	Oceania CW DX Contest
Oct. 8–9	Pennsylvania QSO Party
Oct. 9	North American RTTY Sprint
Oct. 9	UBA CW Contest
Oct. 14–16	YLRL Anniversary SSB Contest
Oct. 15–16	JARTS WW RTTY Contest
Oct. 15–16	Worked All Germany Contest
Oct. 16	RSGB 21/28 MHz CW Contest
Oct. 16-17	Illinois QSO Party
Oct. 29–30	**CQ WW DX SSB Contest**
Nov. 5–7	ARRL CW Sweepstakes
Nov. 19–21	ARRL SSB Sweepstakes
Nov. 26–27	**CQ WW DX CW Contest**

We are a society of categories—age, sex, job type, and so forth. The list is endless. To a certain extent, categorization gives an order to life. Not surprisingly, contest operating is no different. When looking at the sport from an administrative point of view, it would be fantastic to simply sponsor a contest and declare a single winner. Imagine whittling down 8000 CQ WW entries to two victorious entries, one for SSB and the other for CW (there we go again—categories!).

As a practical matter, the concept of a single winner simply does not work. We are an assemblage of competitors who want to engage within our own peer group. For the most part, if I'm an operator in Germany, I want to be recognized for my performance against other contesters in Europe. In the very early years of contesting, operating as a team became very popular and has remained so ever since (although not so initially in the case of the CQ WW). Naturally, a risk that has been carefully managed over time by contest sponsors is avoiding the creation of so many subgroups that everyone wins a prize, diluting the fundamental rewards of winning in the first place.

Thus, whether you want to do your own thing or be part of a large group, contesting can offer something to everyone in the game of competing for fun and winning. With that in mind, let's spend some time looking into the major contesting categories and provide you with some insight on where you should focus.

Single Operator

Without a doubt, this is the most popular category in all of contesting, pitting one operator against others in a test of personal fortitude and drive. Single operating is fulfilling to so many because it is a true testimony to the personal accomplishments of one operator. It's akin to comparing the results of a golfer to those of a lineman on a football team. When the golfer wins, we all know who got it done.

While single operating has huge appeal for many, it's also a lonely sport. For most, it's your gig to win or lose. If you're the social type, it may not be for you. However, being a winner in this category is one of contesting's highest achievements. The competition is the greatest (at least in terms of entrants), and a little luck always comes to play as well.

One of the side benefits of single operating is the fact that many contests allow you to play the game on a single band. This can be very attractive if you operate from a station that works well on some bands but doesn't have the breadth to win it across the entire contest frequency spectrum.

Last, many contests allow for a single operator, low-power alternative (e.g., 100 watts). This is a perfect solution for station owners who are limited to low power or who have neighbors who dictate the rules for them. Again, as a low-power entrant, you can compete on a level playing field with other like-powered stations.

Single Operator Assisted

The assisted category came to be as a result of the packet-spotting tsunami that arrived in contesting nearly 20 years ago. At that time, there was a ground swell of requests to expand the single-operator category to allow for use of packet and have these operators compete amongst themselves. While we can debate over many editorial pages the impact of packet spotting on the hobby, the reality is that it is a technology that's here to stay. Also, if you're one of those who has a medium-size station, it can be a nice alternative to being a pure single operator. The competition, while fierce, is much less than that of the single-operator category.

I can't close this part of the discussion without a few comments on the obvious. As an assisted station, always be sure to copy the callsign and exchange of the station you are working. Dependence on the computer screen for your logging information is poor form and will result in a surprising num-

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e-mail: <K1AR@contesting.com>

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ber of errors in your log. Also, keep an eye on your operating frequency. I've lost count over the years, while operating overseas, how many USA stations called me while operating out of the band as they used the "point and shoot" feature of their logging programs with little regard for their transmit frequency.

Single Operator QRP

This is probably the toughest category in all of contesting. It combines the grueling requirements of single operating with the limitations of ultra-low-power operating. If you have a small station or limited antennas, my strong suggestion is to take a pass. On the other hand, QRP is the ultimate test of operating skill; there is no concept of brute force. By my definition, serious QRPers are some of contesting's finest. They demonstrate a pure love of the sport under some of the most restrictive limitations imaginable. If you're wired this way, go for it!

Multi-Single

Contests such as the CQ WW did not begin their existence with a multi-operator category. However, the notion of multi operators using a single transmitter (or several, one at a time) has become an attractive alternative for our aging contest community, those who no longer desire to participate in the 48-hour single-operator marathon. While very competitive, multi-single operating can be great fun for stations of all sizes and shapes. It allows for social interaction without the need to manage the station complexity of a larger multi-multi setup (keep reading for more). The combination of sleep plus laughter plus a higher score is great for many contesters.

Multi-2

Still somewhat of a boutique category in most contests, multi-2 (multiple operators utilizing two transmitters simultaneously as a "mini" multi-multi) has taken off within the mid-tier station circuit. The leap to a full-bore competitive multi-multi is a club populated by very few stations. However, it is comparatively easy to fire up two or more stations and keep them staffed and running. Even poor-man "M2s" are possible for the smaller multi-ops who choose to avoid the limitations of multi-single rules. Put another way, it's a lot more fun for the second guy to actually be running stations rather than simply tuning for new multipliers.

Multi-Multi

For some multi-multi station owners, this category has generated unyielding dedication to contesting developed over decades. In most cases, entering the category with your checkbook has ultimately proven to be a stage for a quick exit. Simply put, multi-multi operating is a labor of love. The combination of station maintenance, staffing, and keeping the machine running weekend after weekend is not for the faint-hearted. Like all contest categories, winning may not always be the objective. For that reason, over the years many have entered this category with three or four active stations simply to crank out the most points for their club or put several local operators to work in one operating setting. Maybe you're one of those folks?

Perhaps the Best Category of All

It may seem ironic, but not every person who enters a contest is setting out to win. In fact, for most hams contesting is nothing more than pushing one's personal accomplishments to a new level, working a ton of really good DX in a weekend,

A surprise 50th birthday party was held for John, K1AR, in early August in Nashua, New Hampshire. It's not easy to pull the wool over the eyes of K1AR, but the party's organizer (also John's brother-in-law), Doug, K1DG, pulled it off! Left to right seated are Bill, K1GQ; Andy, N2NT; Bill, W2RQ; Dave, K1ZZ; and Gail, K2RED. Standing (also l. to r.) are Gene, N2AA; Stu, KC1F; Dave, NN1N; John, K1AR; Ken, K1EA; Doug, K1DG; John, N2NC; Dave, KM3T; John, W2GD (in front); Tom, K1KI; Bill, K1MM; Mark, K1RX; and Craig, K1QX.

or simply just having a little on-the-air fun. For these reasons, and many others, one of the best categories in all of contesting, and one that has little rule-making behind it, is the "just screwing around for fun" class. Frankly, if it wasn't for the existence of this group of contest participants, contesting as we know it would not exist. While some of us are intent on winning contests, the reality is that we all should be focused on having fun. With the pressures of work, family, and a million other demands on our time, if it isn't fun, why do it? Fortunately, for thousands of hams around the world contesting is one of the hobby's greatest operating endeavors.

As your next contest weekend comes up, think about the category you should enter—not necessarily to maximize your score, but to participate in the one that makes contesting the most fun. That's what it should be about!

Final Comments

As many of you know, there is some lead time between the time when I sit at my desk with a given month's writing assignment and the arrival of the magazine in your mailbox. In recent weeks, I had the experience many of you already know about —becoming 50 years old. It was relatively uneventful until K1DG decided that it would be fun to surprise me with a party at the local Tokyo Steakhouse™. There's nothing like having a bunch of your ham friends in one place to remind you how great our hobby is and why we do this.

Among all of the gifts, fun, and laughter was a very touching present from our very own Gail, K2RED. She somehow found the time to reprint/copy all of my *CQ* columns—July 1989 to the present—and assemble them in binders. It was a touching gesture and one that I'll always remember and cherish. Thanks again, Gail!

Well, that's it for this month. If you haven't gotten to it already, don't forget to complete your 2005 CQ Contest Survey published in last month's column. If you prefer, you can submit an electronic version by going to: <www.hamgallery.com/survey>. 73, John, K1AR

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

The "Unwritten Rules"

Okay, you have had your ham license for a while and are on the air with a radio setup. Your station is in good working order, and you are satisfied with its performance. Since you studied the FCC Rules and passed your exam, you feel that you pretty much know all there is to know (or at least know enough) about operating a ham station efficiently and effectively. However, have you learned the "unwritten rules" of amateur radio?

If you are doing any HF (lower frequency bands below 30 MHz) work, you probably have many callsigns in your logbook from stations both near and far, and maybe you've even exchanged QSL cards with some (or all) of those stations. If you participate in VHF-and-above activities beyond the world of FM and repeaters, the same things may apply as well, as you exchange grid squares with other stations.

What else is there? Can't we "just do radio" by spinning the tuning dial, listening to see if the frequency is busy or open, and calling someone (or calling CQ)?

Like many things in life, things are not as simple as they may seem. There are a number of unwritten rules hams expect one another to follow. Take, for example, instances when the FCC Rules say you may operate a certain mode on a certain frequency, but these unwritten rules say you should not. Some of these "gentlemen's agreements" are codified in voluntary "band plans," while others fall into the broad general areas of "radio etiquette" (see "Beginner's Corner" in the January 2005 issue) or "good operating practices."

For example, you are not violating any FCC Rules if you switch on your linear amplifier to work that weak and somewhat rare station somewhere in Africa on 40 meters, on 7.285 MHz. You might even successfully work that DX station. However, 7.285 MHz is a QRP (low power) SSB *calling frequency*, so using an amplifier to contact another station there is a poor operating practice. Others standing by for a turn to work that station in Africa may realize that you are not a "QRP station" and may put you on their "Bozo" or "Doofus" list, or whatever they may call you in their own disparaging terms. Even worse, the DX station may realize that you just blasted him with a kilowatt of power and simply delete you from his log.

By the same token, if you decide to call CQ on 14.230 MHz, you may get an answer. However, if sometime during your QSO you hear some odd squeaks and noises, you may have to live with hearing slow-scan television (SSTV) signals when you are having your contact, as the generally agreed upon band plan puts SSTV operations around 14.230. Check your frequency dial and move away from the SSTV fellows.

There are no FCC penalties and usually no one will get hurt if you operate on an "improper frequency" within the ham bands. So what is the problem? With many hams sharing the same frequencies and pursuing a variety of modes and activities, a good measure of cooperation is essential. While most everyone makes an occasional slip, your reputation in the ham radio ranks will not be very good if you consistently ignore the unwritten rules and play things the way you want. In ham radio jargon, you will be called a "lid," or poor operator.

I believe that most people who violate the unwritten rules are not doing so intentionally. Instead, it's because they simply are unaware that they exist, since after all, these are the unwritten rules. When and if an experienced person "catches" someone in violation of the unwritten rules, that experienced person should tell the offender (politely) that he is doing something wrong and should then teach the "violator" the right way to do things. By the same token, the new person must be willing to accept some useful criticism and correct his bad behavior or habits.

Operating a Radio—A Privilege, Not a Right

As teenagers, most of us learned that driving an automobile is a privilege, not a right. Operating a radio is no different. The FCC puts it this way in Section 97.101(b) of its rules: "Each station licensee and each control operator must cooper-

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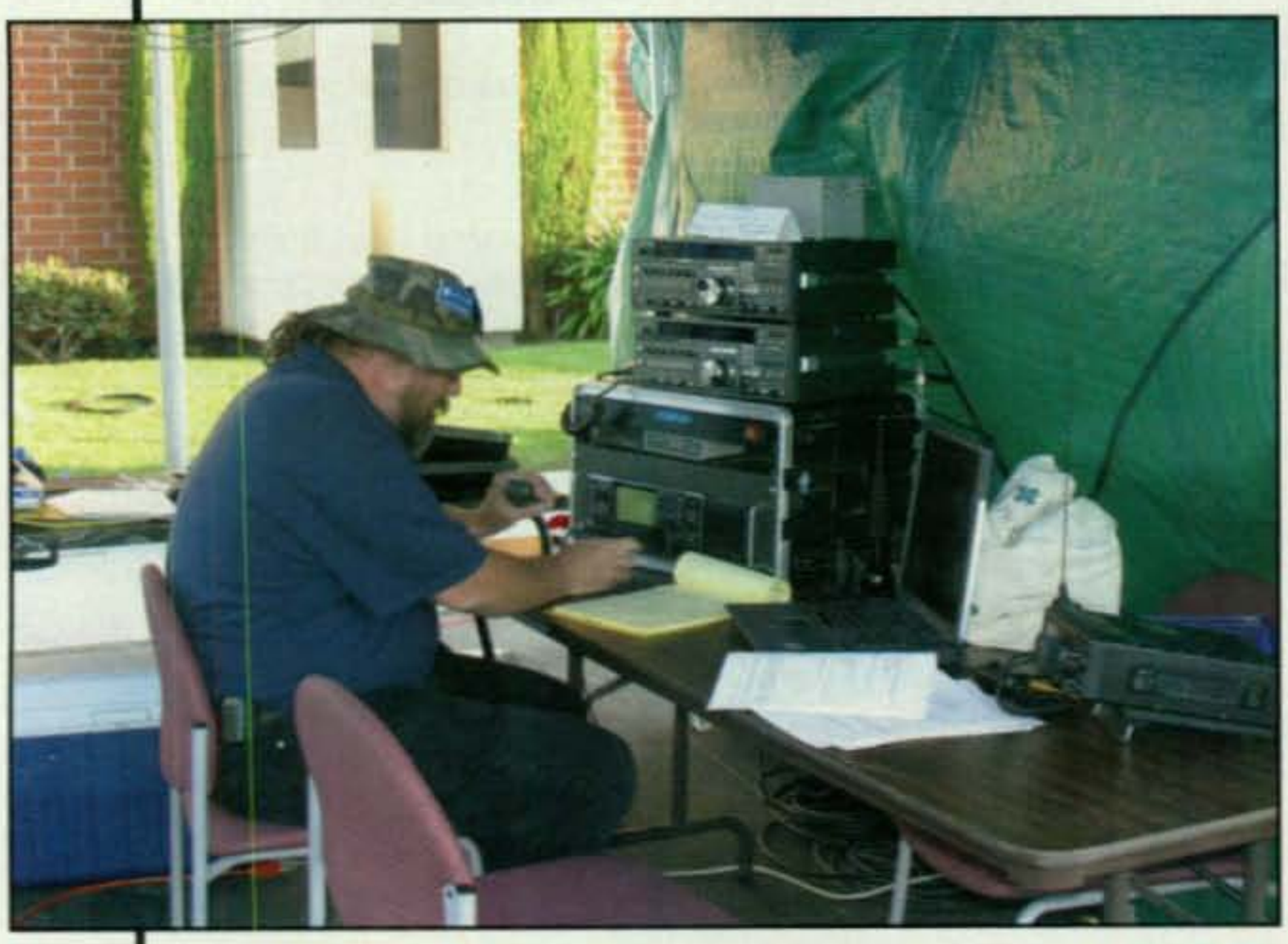
e-mail: <kh6wz@cq-amateur-radio.com>



Dennis Kidder, WA6NIA, listens intently to the 6-meter band during a recent Field Day operation. Remember, the best operators spend more time listening than transmitting.

Visit Our Web Site

What's So Important About DX Windows?

If all amateur frequencies are shared, why are we asked to set aside certain frequencies only for certain types of contacts? To help you understand the concept behind DX Windows and why it is important to respect them, I asked record-holding VHF-and-up operator Chip Angle, N6CA, about the importance of the DX Windows and courteous operating. Here are some of his thoughts:

As much as it hurts, we in the U.S. are not DX. Let the *real* DX stations call CQ *while we listen for them.* No U.S. station should be considered DX to another U.S. station. They may be fun to work but they are *not* DX. Africa, Asia, Oceania, South America, Europe, and Caribbean stations *are* DX to North America. If you want to work some real DX, put up a real antenna as high as you can possibly get it. Having operated 6-meter "real" DX for over 25 years, I have never seen a West Coast station get called by a rare country as the result of a CQ on this end.

All ham bands have a DX Window and gentlemen's agreements generally keep them free and clear of U.S.-to-U.S. contacts. DX has been defined by the 6-meter community for years as off the North American continent and stations operating near the borders. Canada and Mexico are not considered DX under this definition. All continental contacts, by gentlemen's agreement, should be above 50.125 MHz (the domestic 6-meter SSB calling frequency) and well out of the international DX Window around 50.110 MHz. If you really want to call CQ and have rag-chew contacts, there is plenty of space well above 50.125 MHz.

Six-meter operators have been doing a great job of spreading out when the band is open these past few years. It would be nice to see this kind of cooperation on 2 meters as well.

ate in selecting transmitting channels and in making the most effective use of the amateur service frequencies. No frequency will be assigned for the exclusive use of any station."

In other words, no one owns a ham radio frequency. However, as a common courtesy, if a particular frequency is in use, no one should "cut in" unless the stations using that frequency invite you in. When you "spin the dial" to find an open frequency, it is always a good practice to identify and ask the simple question, "Is this frequency in use?" If no one objects, you can initiate a call for a contact. If someone says, "Yes, it is," then find another frequency. More than once I have heard a funny operator answer by saying, "No, it is not," which means that you can use the frequency and call another station or initiate a new contact by calling CQ.

Windows

Speaking of considerate operating and frequency issues, there are some frequency segments within the amateur radio bands called "DX Windows." This has nothing to do with any Microsoft product; it is an unwritten rule and is not necessarily on the FCC license exams. We have DX Windows so that DX stations and U.S. hams have a specific place to look for real DX contacts. Check the ARRL band plans for specifics.

One example of the importance of DX windows is on 6 meters, where radio propagation is seasonal and sporadic. Thus, if you are driving along the highway, randomly dial your radio to 50.110

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MHz and hear nothing, it is *not* a good idea to call CQ there just to see what you can work. While this may sound okay to do at first glance, it is not necessarily a good operating practice. That's because 50.110 is the designated DX calling frequency, and the entire band segment between 50.100 and 50.125 is the DX Window.

Think about this scenerio for a second: You are in your mobile station, with one of those compact, 100-watt, all-band, all-mode radios and a mobile whip antenna. You generally work everything you can hear, so that means that if you cannot hear anything except atmospheric noise, either no one else is on the air or no one within close range can hear you, right? So why not call CQ on 50.110 MHz to see if a DX station can hear you?

This is wrong in many ways, including the part about other stations not being on the air or other stations cannot hear you. Remember that most mobile stations really are a compromise and not truly optimized for long-haul work. Compare the mobile station with 100 watts and a mobile whip to a serious 6-meter station, which most likely includes at least one directional antenna, and many times several directional antennas stacked into a system, and an amplifier with several hundred or more watts of power output. A station like this is capable of hearing and working much more than even the most efficient mobile station. When the operator of a station like this is listening and tuning intently for a DX station far away, he is doing just that—*listening*. The most successful and experienced operators spend most of their time listening and not transmitting. Thus, that eliminates the "if I cannot hear a station, then no one is on the air" thinking. You may be within range of that listening station but be unable to hear the weak DX station he is hearing and waiting to contact.

Okay, so now what happens when the mobile operator (still hearing nothing and thinking it is time to initiate a contact) keys the microphone and calls CQ? First, the mobile station is now causing interference (QRM) to the station hunting the weak DX station. Remember, the mobile station cannot hear the weak and distant station at all, and it is now difficult for the super-station with the big antennas and lots of power to listen for his opening (or "turn") to make a contact with the DX station.

Second, someone else (most likely a fairly new person who also is not aware of the unwritten rule about the 6-meter DX Window) hears the mobile station calling CQ and answers him, adding to the QRM. Now we have two local stations having a conversation on 50.110 MHz, comparing the weather conditions in Santa Monica with the weather conditions in San Diego, about 117 miles (188km) away, and interfering with the very weak DX station. Meanwhile, the far-away DX station is getting ready to turn off his rig and the super-station is still being hammered by local QRM, crushing his efforts to work the distant station, which may be thousands of miles away. For more about DX Windows, see the sidebar "What's So Important About DX Windows?"

(Another unwritten rule: Don't have a conversation on a calling frequency; you should use a calling frequency only to establish a contact, and then you should move off to another frequency for your QSO.)

Contest Weekends

I love a good contest. Thousands of hams all over the world do, too. However, I am sure that for every contest lover out there, there are the same number of folks who hate them as much as we love them. Since ham radio is a pursuit open to all, we all need to be able to get along with one another, including mixing up contesters with non-contesters. When the bands are hot and heavy and you are cranking out the contacts, it is necessary to respect existing or on-going QSOs near your operating frequency.

By the same token, if you are not participating in a contest it is not right for you to cause interference to another station when he is trying to make as many contacts as possible. Sure, many contesters welcome a non-contester to make contact with them since they need to make as many points (valid QSOs) as possible. Try to make sure you do not waste too much of their time by knowing what information the contest station is looking for. This is called the contest "exchange." More information on beginning contesting can be found in the "Beginner's Corner" for October 2004. For a contester's point of view on frequency use read "This is My Frequency—Really!" by John Dorr, K1AR, in the June 2005 issue of *CQ*.

Hook Up with a Mentor

Unknowingly operating at odds with accepted band plans and fighting over frequencies during contests are probably the most often violated unwritten rules. I am sure there are many others, including some that are regional or local in nature. The best way to learn and understand the rights and wrongs of the unwritten rules is to latch onto a good mentor, one who can teach you how to become the best operator you can be. Who knows? Maybe someday you will find an ARRL "A-1 Operator" award in your mailbox!

73, Wayne, KH6WZ

References

The ARRL "A-1 Operator Club" is a unique club. You cannot apply. Two amateurs who already belong to the A-1 Operator Club must recommend you independently. Details are on the ARRL website at <http://www.arrl.org/awards/a1-op>.

The ARRL has a very nice, free, and downloadable frequency chart for U.S. amateurs. However, the DX Windows are not listed. It's online at <http://www.arrl.org/FandES/field/regulations/bands.html>.

"The Considerate Operator's Frequency Guide": <http://www.arrl.org/FandES/field/regulations/conop.html>.

"This is My Frequency—Really!" by John Dorr, K1AR, *CQ*, June 2005, page 103.

A list of SSTV frequencies appears on K3ASI's web page: <http://www.qsl.net/k3asi/freqli.html>.

Some adventures on 6 meters from Chip Angle, N6CA: <http://www.ham-radio.com/n6ca/50 MHz/50ops.html>.

Voluntary Operating Code of Practice for 6m Operators, United Kingdom Six Metre Group (UKSMG): < http://www.uksmg.org/code.htm>.

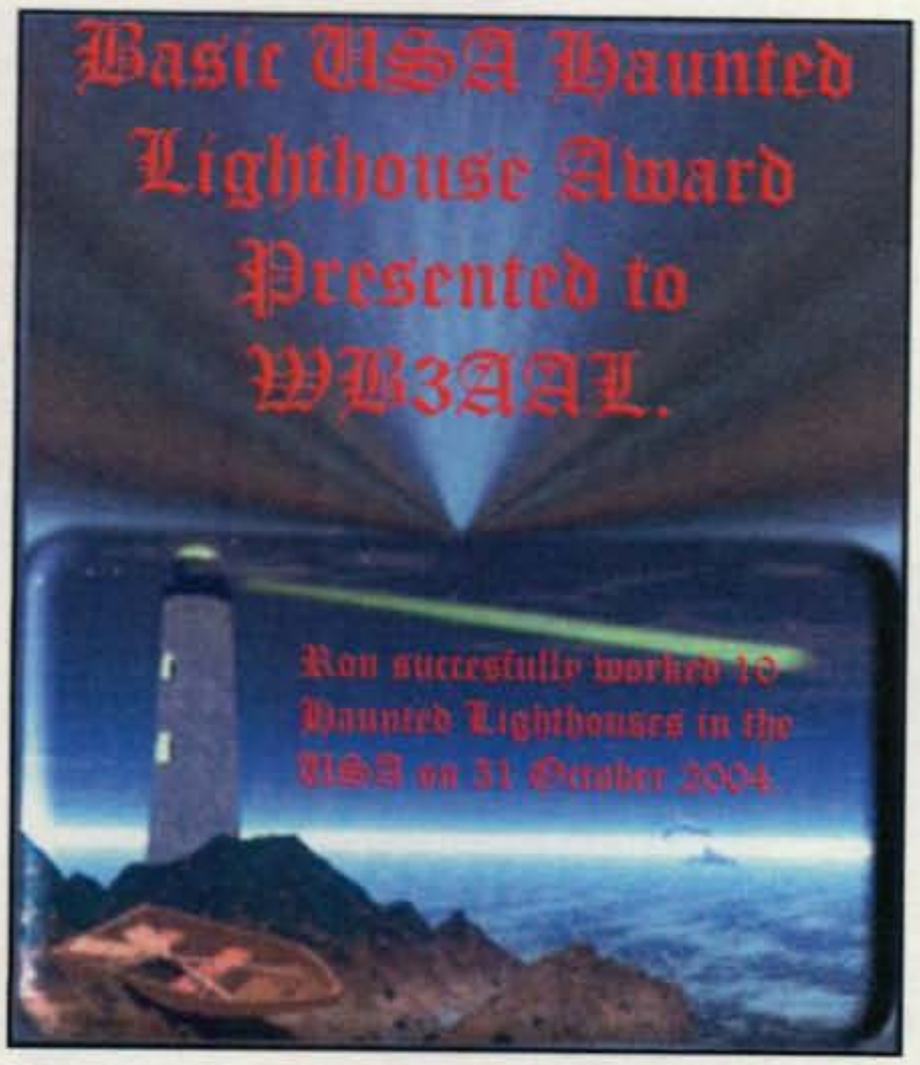
"50 MHz Propagation Mechanisms," by J. R. Kennedy, K6MIO/KH6, is a technical look at how 6-meter propagation works: <http://www.ham-radio.com/n6ca/50 MHz/K6MIO_50 MHz_F2Prop.pdf>. Another excellent resource on the topic is *CQ's VHF Propagation*, by *CQ* Contributing Editors Ken Neubeck, WB2AMU, and Gordon West, WB6NOA: <http://unix8.sunserver.com/cq/Detail.bok?no=109>.

Other sources include DX and contest clubs and your local amateur radio organization. If you live outside the U.S., you may also find help from your national association, equivalent to the ARRL <http://www.arrl.org>: RAC (Canada) <http://www.rac.ca/>; RSGB (UK) <http://www.rsgb.org.uk/>; and JARL (Japan) <http://www.jarl.or.jp>, English version: <http://www.jarl.or.jp/English/0-2.htm>) are some examples.

BY TED MELINOSKY,* K1BV

Haunted Lighthouses!

Just in time for the October issue of *CQ*, this time we begin with the Haunted Lighthouse Award. The purpose of lighthouses is to prevent maritime disasters, but the lonely lives of the some of the keepers and their families have seen some strange goings-on. A surprisingly large list of lighthouses supposedly with a resident ghost or two is available online at the sponsor's website (see below).



The Haunted Lighthouse Basic International Award is issued for a minimum of five contacts.

The Haunted Lighthouse Award

This is permanent award program is for contacts after September 1, 2001 with lighthouses as specified on the sponsor's list. Each of these lighthouses has a legend or story about one or more ghosts or apparitions that inhabit the premises.

Basic USA Award—ten Haunted lighthouses from the USA list.

2. Basic International Award - contact 5 haunted lighthouses from the international list.

3. Worked All USA Haunted Lighthouses—contact all 54 from the USA list.

4. Worked All International Haunted Lighthouses—contact all 12 from the International list. (All lighthouse contact numbers are based on current information and are subject to change when new ones are added.)

5. Haunted Lighthouse Activators Award—for any station that activates a lighthouse on the list, makes 25 or more contacts, and stays overnight on the premises. (No charge for this one!)

The sponsor will honor the ARLHS Visual Sight Rule which permits contacts to be made from the vicinity of the lighthouse as long as it can clearly be seen. (However, lighthouse activators will still need to stay overnight in order to get the free award!) Fee for the basic award is $US2 for U.S. stations and $US3 for all others. Fee for the international award is $US5 and $US6 for all others. SWL okay. Send list of lighthouse contacts and proper fee to: Ronald J. Polityka, WB3AAL, 3050 Elm Road, Reading, PA 19605-2343 (website: <http://www.wb3aal.com>).

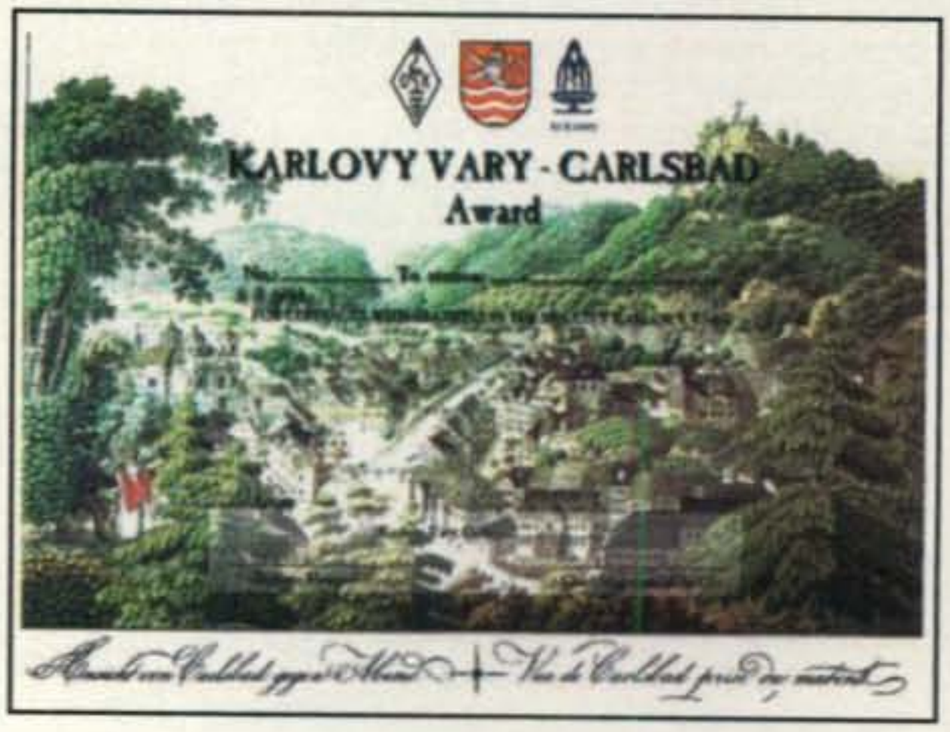
USA-CA Honor Roll

500		1500	
IK6CAC	3357	W8WV	1421
UA3BS	3358		

The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 12 Wells Woods Road, Columbia, CT 06237 USA. DX stations must include extra postage for airmail reply.

DX Awards

Czech Republic's Karlovy Vary Carlsbad Award. Karlovy Vary (Carlsbad) is the most famous and largest spa in the Czech Republic. It was discovered in 1358 and is renowned as a cultural center of the region. Visitors can enjoy a variety of performances, from open-air concerts to the International Film Festival held in September each year. This attractive resort town, with its many 19th century mansions and hotels, is nestled among



Contact stations in Carlsbad, the Czech Republic, to earn the Karlovy Vary – Carlsbad Award.

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>

The Goethe Award is issued by the DARC Division Ilmenau for contacting locations closely associated with the life of the famous German writer Goethe.

beautiful rolling hills and once was visited by many notable personalities, among them Empress Maria Theresa, Don Pedro II, the emperor of Brazil, Bach, Beethoven, and even Casanova, just to name a few. Carlsbad boasts 12 mineral springs with their waters used primarily for the treatment of a number of ailments, as well as for just helping to relax the body.

The award is issued by the Carlsbad City Council in cooperation with radio club OK1KVK. It is available for radio amateurs worldwide for contacts with stations operating in Carlsbad on or after July 1, 1998. A contact with club station OK1KVK (contest call OL7C) is mandatory. For VHF, contacts with 20 radio amateurs operating from Carlsbad or members of radio club OK1KVK are necessary. On the HF bands contacts with four stations are needed. For a mixture of VHF and HF, contacts with 20 different stations is are needed. It is not necessary to have QSL cards. Send GCR (General Certification Rule) list and fee of 50 Kc, 60 Sk, 7 IRCs, or 2 Euros to award manager Petr Pohanka, OK1FKV, Jahodova 285, Karlovy Vary 7 Doubi, 360 07 Karlovy Vary, Czech Republic (website <http://www.ok1kvk.net/eindex.htm>).

Germany's Goethe Award. Generally recognized as one of the greatest and most versatile European poets and writers of modern times, Johann Wolfgang von Goethe had a great impact on the growth of literary romanticism. Best known for his lyrical poetry, novels, and particularly for his

It Only Took 40 Years!

By Bob Schenck, N2OO, USA-CA All Counties #1116

It only took 40 years, but I did it. I worked all counties—*yes!*

I've been an active ham ever since my Novice days in 1965 at the age of 14 as WN2RJJ. I quickly upgraded to general (WB2RJJ) the same year, and then to Advanced and Extra in the mid-'70s, when I changed my call to N2OO. I have always had a sincere interest in being radio "active"! DXing, contesting, award chasing . . . even traffic handling at one time were all important to me. I have also always found myself to be a leader in local clubs, doing my best to get others involved.

My interest in county hunting began back in 1973 when I met Gary Medford, W2EQK (who became N2CW). Gary was USA-CA holder #70, having accomplished that feat in 1971. He became a Silent Key in 1985. In the late '70s I chased counties to a degree. I often ran the 75-meter county hunters net on 3.943 MHz, but life got busy and I found myself redirecting my energy to DX and DXpeditions.

In 1979 I found myself involved in the 1S1DX Spratly Islands DXpedition. As we approached the island from which we were to operate (Amboyna Cay), four mortar rounds were fired at our sailboat; luckily they missed. I ended up operating as VS5OO from Brunei, making about 10,000 QSOs while three of the original six team members made a second attempt to locate an uninhabited island in the Spratly Islands from which to operate. They were successful, and the DXpedition bug bit hard. Over the 25 years that have followed, I have been on numerous DXpeditions, the most recent being the October 2003 BQ9P Pratas Island expedition, followed by several weeks as 9M6OO in East Malaysia.

I am also an active QSL Manager, handling cards for most of my DX operations as well as others. I currently handle 92 calls involving over 100 operations. many of these go back over 30 years, but a few are ongoing. last year I sent out about 80 pounds of QSL cards to the bureau system alone. In 2001 I organized the QSL Manager's Society. This is a web-based organization created to provide a single point of contact for quality QSL Managers. It can be viewed at <http://www.qsl.net/qslmanagers>.

In 2002 I retired after 33 years with the local phone company. I finally decided to restart chasing counties. I had not tracked any counties for many years. I pulled out *all* of my USA QSL cards and entered the data into my WinEQF logging program. When I was done, I had about 1400 counties confirmed. Although the USA-CA program allows me to use QSLs for *any* call I ever used from any country, I decided not to include my DX operations for the award. All confirmations would be from my USA-based operations only.

Bob Schenck, N2OO, USA-CA All Counties #1116, March 5, 2005.

Thus, in April 2004 I restarted my county chasing. It was a fun ride as I rediscovered county hunting. I gradually learned all the tricks, such as using the spotting network on the internet, utilizing my dual-receive feature to listen to the SSB net and the CW net at the same time . . . then doing more on 30 and 40 meters. I even bought a baby monitor so I would be able to work in the yard or garage and not miss anything! I added HF to my new PT Cruiser, too, so I wouldn't miss anything while I was out running errands. I also ran counties whenever I was able to take a ride. It was quite a thrill to give Hollis, KC3X, his last county for USA-CA All Counties CW.

I want to thank everyone involved with the county hunters program for their help and camaraderie over the past year. Special thanks to Ron, KB6UF, from driving to St. Charles Parish, Louisiana to get my last county for me! I especially want to thank my XYL Beth, KF2BQ, for her patience while I worked on this challenge. I don't know if I ever will attempt to do this again, but I will surely put out counties from time to time from my PT Cruiser!

See you in the pile-ups . . . *73, Bob, N2OO*

dramatic poem "Faust," Goethe also made contributions to biology and to the history and philosophy of science. He was one of the greatest figures of German culture, encompassing literature, science, music, and philosophy within his work.

The 250th anniversary of Goethe's birth was celebrated in 1999. The commemorative award shows the Goethehäuschen, where Goethe lived and wrote some of his important works. The design also features reliefs of Goethe both as a young man and shortly before his death in 1831.

The award is issued by the DARC Division Ilmenau (DOK X30). To earn the award, contact regions or locations that were closely associated with the major events in Goethe's life. One hundred points made after January 1, 1998 are needed. SWL okay. The classes are shortwave, VHF/UHF, and VHF/UHF including repeaters.

Point values:

1. Each different station from the following DOKs = 5 points: X03, X04, X09, X11, X18, X19, X21, X22, X24, X30, X34, F05, F49, F57, S30, S31, S37, Z05, Z83, and Z91.

2. Club stations from these DOKs = 10 points.

3. Special event stations with special DOKs = 20 points.

No mode or band restrictions. CW contacts count double. At least one of the following club stations must be contacted: DLØWEI (X03), DKØTUI (X30), DFØTUI (X34), DAØHQ/DFØHQ (X34), and DLØRUD (X24). Send GCR list and fee of 5 Euros or $US8 to: Wilfried Besig, DH5WB, Sperberring 17a, D-98693 Ilmenau-Oberpoerlitz, Germany (also: Darc e.V. OV-X30, "Goethe Award," PSF 100261, D-98682 Ilmenau, Germany).

Italy's John Paul II, The Peace Expeditioner Award. The ARI Section Sala Consilina sponsors this very handsome award honoring the life and accomplishments of Pope John Paul II, who was the most traveled pontiff in history, visiting more than 130 DXCC countries around the world.

Contact/listen to stations in the countries that John Paul II visited during his lifetime. The award is issued in different modes: Mixed, Phone, CW, and Digital. Each mode has three levels: Basic = 40 countries, silver = 80 countries, Gold = 131 countries. QSOs from January 25, 1979 on are valid. Send log extract and fee of 10 Euros to: ARI sezione Sala Consilina, P.O. Box 11, 84036 Sala Consilina (SA) – Italy (e-mail: <erminio @erminiocioffi.it>).

Contact stations in countries Pope John Paul II visited to earn the Peace Expeditioner Award.

Countries visited by John Paul II: Albania ZA, Angola D2, Argentina LU, Armenia EK, Australia VK, Austria OE, Azerbaijan 4K, Bahamas C6, Bangladesh S2, Belgium ON, Belize V3, Benin TY, Bolivia CP, Bosnia-Herzegovina T9, Botswana A2, Brazsil PY, Bulgaria LZ, Burkina Faso XT, Burundi 9U, Cameroon TJ, Canada VE, Cape Verde Island D4, Chad TT, Chile CE, Colombia HK, Congo TN, Ivory Coast TU, Costa Rica TI, Croatia 9A, Cuba CO, Netherlands Antilles PJ2, Denmark OZ, Ecuador HC, Egypt SU, El Salvador YS, Estonia ES, Fiji Island 3D2, Philippines DU, Finland OH, France F, Gabon TR, The Gambia C5, Georgia 4L, Federal Republic of Germany DL, Ghana 9G, Jamaica 6Y, Japan JA, England G, Greece SV, Guam KH2, Guatemala TG, Rep. of Guinea 3X, Guinea-Bissau J5, Equatorial Guinea 3C, Haiti HH, Honduras HR, India VU, Indonesia YB, Ireland EI, Iceland TF, Solomon Islands H4, Israel 4X, Italy I, Kazakhstan UN, Kenya 5Z, Lesotho 7P, Latvia YL, Lebanon OD, Liechtenstein HBØ, Lithuania LY, Luxembourg LX, Malagasy Rep. 5R, Malawi 7Q, Mali TZ, Malta 9H, Morocco CN, Mauritius 3B8, Mexico XE, Mozambique C9, United Nations HQ 4U-UN, Nicaragua YN, Nigeria 5N, Norway LA, New Zealand ZL, Netherlands PA, Pakistan AP, Panama HP, Papua New Guinea P2, Paraguay ZP, Peru OA, Poland SP, Portugal CT, Puerto Rico KP4, Czech Rep. OK, Central African Republic TL, South Korea HL, Dominican Republic HI, South Africa ZS, Reunion Island FR, Romania YO, Rwanda 9X, St. Lucia J6, San Marino T7, Sao Tome & Principe Islands S9, Senegal 6W, Seychelles S7, Singapore 9V, Syria YK, Slovakia OM, Slovenia S5, Spain EA, Sri Lanka 4S, USA K/W, Sudan ST, Sweden SM, Switzerland HB, Swaziland 3DA, Tanzania 5H, Thailand HS, Democratic Republic of Timor Leste 4W, Togo 5V, Trinidad & Tobago 9Y, Tunisia 3V, Turkey TA, Ukraine UR, Uganda 5X, Hungary HA, Uruguay CX, Venezuela YV, Zambia 9J, and Zimbabwe Z2.

Confirmed contacts with ten stations in Lisbon, Portugal are needed to apply for the Lisbon City Award.

Portugal Lisbon City Award. Here is a simple award that requires only that you contact stations in a particular city, in this case, Lisbon. I was lucky enough to visit this historic and beautiful city last year. My QSL collection has only seven stations in the city, but several are dated before the starting date for the award. Therefore, like many partially completed awards, the city of Lisbon is on my list to check for incoming cards in the future.

Contacts with ten stations in Lisbon after June 1, 1988 are needed for the award. SWL okay. Only seven are needed if CT1REP, the IARU representative, is contacted. The award can be earned for HF or VHF. Send GCR list and fee of 3 Euros for REP members; 10 Euros, $US8, or 12 IRCs for Europeans; and 12 Euros, $US10, or 15 IRCs for all others. Apply to: REP – Rede dos Emissories Portugueses, Award/Contest Manager, Rua D. Pedro V, 7-4, 1250-092 Lisboa, Portugal.

Looking for award publicity? *CQ magazine* is the only U.S. amateur radio magazine with a monthly awards column. We can help you. Send me the details and let's see what can be done to put the rules in front of thousands of *CQ* readers. 73, Ted, K1BV

vhf plus

BY JOE LYNCH,* N6CL

Two FlexRadio SDR-1000 Radios Used as a Transponder

Another first for the remarkable SDR-1000 radio is its successful trial as a transponder. The following is from Bob McGwier, N4HY:

At the labs of CNS Systems, Inc. in Maryland (W2GPS business), Rick Hambly, W2GPS, Tom Clark, W3IWI, and Bob McGwier, N4HY, finished cobbling together the software defined radio transponder (SDX) prototype on August 17, 2005. We successfully conducted a three-way QSO in the 45-kHz wide Mode A transponder. Mode B, software selectable, was added the following week.

The SDX is based on the software designed and written by Frank Brickle, AB2KT, and Bob McGwier, N4HY. We have used the SDR-1000 as most nearly fitting our early needs. Today's prototype demonstration was done using two SDR-1000 radios (see <http://www.flex-radio.com>). For more information on the software used into their first success, see: <http://dttsp.sourceforge.net>.

At the AMSAT annual symposium in Lafayette, Louisiana between October 7–9, 2005 we will have both the Mode B and the Mode A transponder fully functional and usable by anyone who wishes to try it out. We will show the power of using software defined radio for the transponders by having one half of the transponder divided into two or three FM channels and the other half fully linear whilst adding a 400 bps AMSAT standard beacon in the middle, *and* on command, switch it to fully linear, etc. Given our initial success, we will proceed with development of fully functional SDR equipment that can be adapted to multiple missions that *might* be flyable on Phase 3E but will absolutely be on the AMSAT Eagle spacecraft. For more information on the symposium, please visit <http://www.amsat.org/amsat-new/symposium/index.php>.

STS-114 a Qualified Success

This past August the Space Shuttle Discovery flew a test flight to the International Space Station; amateur radio packet equipment was delivered and installed. As the following excerpts indicate, the flight was a qualified success due to lingering problems with foam and tile dislodging during the launch.

Shuttle Discovery Returns Safely

The following is from the *ARRL Letter* of Aug. 18th.

The space shuttle Discovery touched down safely at Edwards Air Force Base in California on August 9 at 1211 UTC. The picture-perfect, pre-dawn West Coast landing, necessitated by continued poor weather conditions at Kennedy Space Center—the primary landing site, brought to a close an extended STS-114 "Return to Flight" mission, the first since the February 1, 2003 shuttle *Columbia* tragedy.

"Congratulations on a truly spectacular test flight," Mission Control told the crew after the touchdown. "Welcome home friends."

Responded Discovery Commander Eileen Collins, KD5EDS, "We're happy to be back."

Discovery, which carried a crew of seven—including six Amateur Radio licensees—into space, originally was scheduled to return to Earth on August 8. During its two weeks in space, the crew demonstrated new methods to inspect and repair the shuttle in orbit. The shuttle crew also delivered supplies and outfitted and performed maintenance on the ISS, conducting a number of these tasks during three spacewalks. Discovery crew members also installed the PCSat2 Amateur Radio package, which underwent commissioning shortly after its installation.

Hosting the *Discovery* team on the ISS were Expedition 11 Commander Sergei Krikalev, U5MIR, and NASA ISS Science Officer John Phillips, KE5DRY. The shuttle crew also included Soichi Noguchi, KD5TVP, who did the PCSat2 installation; James Kelly, KC5ZSW; Charlie

VHF Plus Calendar

Oct. 2	Moderate EME conditions
Oct. 3	New Moon
Oct. 5	432 MHz Fall Sprint
Oct. 7–9	AMSAT Space Symposium (See text for details.)
Oct. 8	*Draconids* meteor shower predicted peak
Oct. 9	Very poor EME conditions
Oct. 10	First Quarter Moon
Oct. 14	Moon Perigee
Oct. 15	Microwave Sprint
Oct. 16	Good EME conditions
Oct. 17	Full Moon
Oct. 21	*Orionids* meteor shower predicted peak
Oct. 22-23	50 MHz Fall Sprint. ARRL 50 MHz to 1296 MHz EME Contest first weekend
Oct. 23	Poor EME conditions
Oct. 25	Last Quarter Moon
Oct. 26	Moon Apogee
Oct. 27-31	Microwave Update Conference. See text for details.
Oct. 30	Poor EME conditions

—EME conditions courtesy W5LUU.

(Left to right) Tom Clark, W3IWI, Rick Hambly, W2GPS, and Bob McGwier, N4HY, after the software defined radio transponder demonstration QSO. (Photo courtesy of N4HY)

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Camarda, KC5ZSY; Wendy Lawrence, KC5KII; Stephen Robinson; and Andy Thomas, KD5CHF/VK5MIR, who made some casual amateur radio QSOs while *Discovery* and the ISS passed over his native Australia.

Discovery's crew enjoyed a welcome home celebration August 10 at Houston's Ellington Field.

Because of Doppler shift the UHF signal from PCSat2 at acquisition of signal (AOS) will be as much as 9 kHz high, and at loss of signal (LOS) it will be as much as 9 kHz low. But at AOS and LOS, the Doppler shift is less, and both are good times to capture telemetry files without running into serious tuning problems. Doppler shift is the greatest at mid-pass.

PCSat2 will remain affixed to the ISS for approximately one year. For more information, visit the PCSa2 Operations website: <http://web.usna.navy.mil/~bruninga/pec/pc2ops.html>.

NASA Targets March for Next Space Shuttle Mission

The following is from NASA News:

NASA is targeting March for the next Space Shuttle mission (STS-121). The mission will be the second test flight to the International Space Station in the Shuttle Return to Flight sequence.

NASA Administrator Michael Griffin and Associate Administrator for Space Operations Bill Gerstenmaier made the announcement today at a news conference at the agency's headquarters in Washington.

"We are giving ourselves what we hope is plenty of time to evaluate where we are," said Administrator Griffin. "We don't see the tasks remaining before us being as difficult as the path behind us."

Based on NASA's self-imposed optimum lighting requirements, the earliest possible launch opportunity for the STS-121 mission is March 4, 2006. The Space Shuttle *Discovery* will be used for the mission, instead of Space Shuttle *Atlantis*.

(The STS-121 crew will be: Commander Steve Lindsey; Pilot Mark Kelly; Mission Specialist Mike Fossum; Mission Specialist Piers Sellers; Mission Specialist Lisa Nowak, KC5ZTB; and Mission Specialist Stephanie Wilson, KD5DZE.)

Moving toward a no earlier than March launch for STS-121 will allow engineering teams more time to properly evaluate the issue of large pieces of insulating foam that came off *Discovery's* external fuel tank during the launch.

Targeting March also allows the Space Shuttle Program to put itself into a better posture for future Shuttle missions to the Space Station. Changing Orbiters for the STS-121 mission enables use of *Atlantis* for the following mission, STS-115, which will resume assembly of the station.

The switch frees *Atlantis* to fly the remaining Space Station truss segments, which are too heavy for *Discovery*, in 2006. By changing the Orbiter line up, the Shuttle program will not have to do two back-to-back missions with *Atlantis*, as previously scheduled.

"It really makes sense to move to the March timeframe," Gerstenmaier said. "We're looking at the Shuttle missions to support the most robust flight sequence for the Space Station and to make the whole sequence flow better. This extra time helps us make sure that all the work we need to do fits and that there are no other issues."

Discovery's recent mission, STS-114, and the STS-121 mission are test flights. They will enable NASA to evaluate new safety procedures and equipment, giving the agency greater confidence that the Shuttle can be flown safely through its planned retirement date of 2010.

The external fuel tanks at NASA's Kennedy Space Center in Florida are to be shipped back to the Michoud Assembly Facility in Louisiana for tests and potential modifications.

For information about the STS-114 Return to Flight mission and future Shuttle flights, visit: <http://www.nasa.gov/returntoflight>. For information about NASA and agency programs on the web, visit: <http://www.nasa.gov/home/index.html>.

NTBP Number 12 a Success

The North Texas Balloon Project (NTBP) has announced the successful launch and recovery of its 12th balloon. Named the Flight of the SS Minner, the launch took place at the Hillsboro Municipal Airport in Hillsboro, Texas on August 20 at around 8:30 AM CDT (1330 UTC). The recovery was near De Soto, Texas, southwest of Dallas. Exact details of the launch and recovery were not available at press time.

The following information on the payload is from the group's website, <http://www.ntbp.org>:

When North Texas Balloon Project Flight number twelve traveled aloft, it carried a special secondary payload designated "VETS," or Voice Encoding Temperature Sensor. This payload was built by members of the Fannin County Amateur Radio Club, K5FRC, based in Bonham, Texas. The payload was to be observed by radio amateurs, scanner enthusiasts, or anyone from the general public who has an interest in collecting temperature data from the payload package using simple VHF FM receiving equipment as the balloon ascended to an altitude of 90,000 feet above the surface of the Earth.

The payload is largely comprised of readily available off-the-shelf consumer-type products. At the heart of the system and serving as the central housekeeping unit is a Microchip PIC12F675 micro-controller. The primary function of the PIC controller is to manage the proper sequencing of various modules used to transmit time and temperature data to the ground in one-minute intervals.

The modules the housekeeping unit managed included an NHRC-2 low-power, low-cost repeater controller, a talking clock, and

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talking indoor/outdoor thermometer. The time and temperature data from the payload was to be "spoken" to the ground using plain-language human voice messages provided by a Voice Zone talking indoor/outdoor thermometer and talking clock module. The repeater controller passed audio between the clock and thermometer modules to an Alinco DJ-C1 350 milliwatt 2-meter FM transmitter that operated on a frequency of 146.560 MHz. The controller also provided watchdog timing and voice ID functions as well. The Alinco transceiver has been modified to accept an internal antenna, and the VETS payload utilized a half-wave dipole antenna for the downlink signal to the ground.

In addition to controlling the housekeeping of the VETS payload, the Microchip PIC12F675 also controlled a Concord 4060AF 4-megapixel digital camera. The micro-controller triggered the camera to capture an image in two-minute intervals throughout the entire ascent and descent of the flight. Images will be downloaded from the camera once the package is recovered following the flight and posted to the K5FRC website.

Observers were encouraged to monitor the VETS downlink signal on 145.560 MHz and make note of signal conditions from the payload as well as the time and temperature data from the payload. Individuals who forward their observations to the Fannin County Amateur Radio Club, P.O. Box 684, Bonham, TX 75418 will in return receive a special QSL card confirming their reception of data from the flight. Anyone with questions may contact VETS Project Manager, Doug Loughmiller, W5BL, at <w5bl@arrl.net>.

More information on the launch and recovery of this flight will be published in a future column.

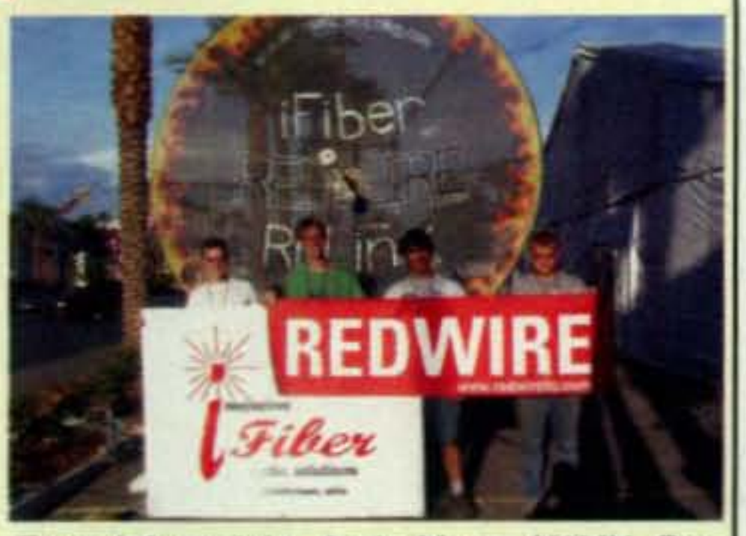
New World Record for Unamplified WiFi Communications

The new official world record for unamplified WiFi communications is 124.9 miles. The team of Justin Rigling, KC8OIO, Brandon Schamer, KG4NVK, Andy Meng, N8MX, and Ben Corrado, KC8RKO, bested their old record of 55.1 miles set last year. The record was set from Mt. Potosi, 22 miles south of Las Vegas, Nevada to Utah Hill, just inside Utah on the Utah/Arizona border, on July 30, 2005.

The following about their record is from Justin Rigling, KC8OIO:

An unamplified connection at 11 Mbps was attained and kept up for three hours. During this time 11,000 successful pings were made. Both ends of the link were using SSH and logged into the other end. VNC was also used successfully *without* frames being dropped. Ping times varied from 0.01 ms to 400 ms, seeming to average around 10 ms. The connection had an astounding signal strength of –37 dBm, bottoming out at around –50 dBm throughout the three hours. The noise levels were around –84 dBm.

We also used an amplifier provided by RFLINX on the Utah end (the base-station end had FAA 2.4-GHz communications, so we chose to keep our ERP low on that end). When the amp was used, the signal strength bumped up to –18 dBm at 124.9 miles! This rock-solid connection is an amazing tribute to the awesome engineering that RFLINX puts into its products. If you want to make a connection like ours without all of the hard work, contact RFLINX and they can get you set up with everything you need.



From left to right, Andy Meng, N8MX, Ben Corrado, KC8RKO, Justin Rigling, KC8OIO, and Brandon Schamer, KG4NVK—the team known as "Team iFiber Redwire," named for two of their sponsors—stand in front of one of the dishes used for the record communications. (Photo courtesy of KC8OIO)

Many thanks go out to Redwire LLC and iFiber, as well as ICOM, HTT Insurance, RF Linx, and SECO, and our family and friends. We could not have done it without the generosity of these people.

The team will have more technical details and plans on how to build the stuff they made on their website (http://www.wifiworldrecord.com/) in a future article in *CQ VHF* magazine.

On the Air

Julio Medina, NP3CW, sent the following report for June and July for his 6-meter activity. This is activity to FK68:

On 4 June, FY1FL, GJ35; on 5 June, KR4U EL96; N3DB FM18; WØPB EM28; WA8EFC N8II FM?; K2BLA EL99; WØMS, K5YY EM26; K9RJ EN51; KØYW DM67; K5VRX FM18; K5YY EM26; K7NEJ EL96; KØEU DM79; KØXXX EM46; K2DRH EN41; WB2TQE EL96; K4CMC EL89; N1DL EL95; KO4BB EM60; W4IHI EL87; KO4YC, KG4DXJ, N4JAD EL87; W9RM, AI4FR, W2VDE EL86; K1HUC EL88,; W4ZWY EM 80; N5UW EM15; NJ2F EL96; KG4DXJ, PJ2BVU FK52; N4KJP EL96; KI4IMA EL96; 6Y5IC, PZ5RA, GJ25, FJ5TX, FK87; J69EN FK94; YV4DYK FK60; and HK4SAN FJ26.

On 6 June, W8NJR and N3DB. On 11 June, IW5DHN, JN53. On 12 June, G8BCG, EI5FK, PC5C, PA7MM JO23; PC1T, PE1BTX JF22; GØUYC JO02, GØGMB IO92; EI3JE, G4DEZ JO03; MW1MFY IO81; G1ZJP IO92; G3VMJ, PA3GSU, and F6FHP IO70. On 15 June, FY1FL 21:57Z. On 17 June, KA9CFD EN40; N3DB, K3TJK FM46; 5T5SN (a new one for me), CY9SS (a new one on CW). On 18 June, 5T5SN, VE1YX FN74; K1TOL FN44; K2ARB, FP/N6RA, and VE3SPW FN04. On 19 June, CY9SS and KP2BH heard. On 25 June, FM5JC, J3/K5AND, W9UI/NP2, J68AS, and PZ5RA GJ25. On 27 June, CU2AF heard weak, EH7KW. On 29 June, 5T5SN, 8R1RPN heard weak but he did not copy my callsign correctly.

On 1 July, 8R1RPN, GJ06, and NP2/W9UI. On 2 July, CO8DM FL11; N4CC EM80; N4NN, HK4SAN FJ26; J3/K5AND, FM5JC, and J68AS FK94. On 4 July, HK4SAN, PJ2BVU FK52. On 7 July, NP2/W9UI, GW3JXN, and GW3LEW IO71; PJ2BVU and EA8BPX. On 8 July, EH1WZ IN63; EH1DKV IN53; F5LNU JN04; F8OP JN26; F8BYM IN90; F8IJV JN52; F2JD JN25; I2AOX, F1DUO, EH1TA, EH1DKV IN53; I4CIL JN64; F5VOT, F5DE, EH4EAT, F6FHP, and 9H1AW.

On 9 July, K7BV/1, K1GUP FN54; and WA1NYV. On 10 July, KP2BH, FK77, NM4O, FM04, KF4YCP, and W4MAY EL97. On 16 July, VP2E FK88. On 18 July, KO1U FN42; W2LK, VE1YX FN74; K1GUP FN54; N1DZ FN41; VE2QRA FN46; N1NOL FN31; K2OVS FN30; KB1DMX FN31; AB2RF FN30; VE2PEP, KB2YBC FN12; W2CXM FN12; K7BV/1, KB1LKB FN31; VE3FIT FN03,; W1EN FN32; N8OC EN03; K2PLF FM19; AK3E, W4LL FM19; VE3BQN, W3LL FM19; WA2MUA FN30; WA1T FN43; AE3T FN20; VE3NH, K2PS, W1PX, KO1H, W3KC FN00; N4MM, W3SI, WZ1V FN31; KA4PD FN31; NA2P, K8KS, and K2SIX FN41. On 19 July, K8IU, W5DAS, KG4PSR, WP4O/4, W4TTA, and N4VC. On 28 July, KØHA EN10; WKØE EM48; and KØIO EN31. On 31 July, YY1RDX FJ49 and YY1AFM FJ49.

Ken Neubeck, WB2AMU, reports the following: "Some aurora came into Long Island (FN30) on July 10 around 5 PM on 6 meters CW as follows: 2205 UTC, VE3GIB FN25; 2217 UTC, N8CJK EN84; and 2231 UTC, K2MUB FN21. This follows the June VHF contest opening of June 12 by one month, so it appears that this area of the sun is

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still active. I have observed more aurora contacts this June and July than *Es* contacts!"

Current Contests

The **432 MHz Fall Sprint** will be October 5, 7 PM to 11 PM local time. The **Microwave (902 MHz and above) Fall Sprint** is October 15, 6 AM to 1 PM local time. Note that you are to operate no more than five hours, in one-hour blocks, during this contest time slot. The **50 MHz Fall Sprint** is 2300 UTC October 22 to 0300 UTC October 23. The **ARRL 50 MHz to 1296 MHz EME Contest** is October 22–23.

For ARRL contest rules, see the issue of *QST* prior to the month of the contest or the League's URL: <http://www.arrl.org>. For Fall Sprint contest rules, see the Southeast VHF Society URL: <http://www.svhfs.org>.

Current Conventions and Conferences

The 2004 **AMSAT-NA Space Symposium and Annual Meeting** will be held October 7–9 in Lafayette, Louisiana at the Holiday Inn Central. For more information, see the AMSAT URL pertaining to the symposium at: <http://www.amsat.org/amsat-new/symposium/>.

The annual **Microwave Update** conference dates are October 27–31, and it is to be held at the Sheraton Cerritos Hotel, Towne Center, Cerritos, California. For more information, see the North Texas Microwave Society's URL: <http://www.ntms.org>.

Call for Papers

Calls for papers are issued in advance of forthcoming conferences either for presenters to be speakers, or for papers to be published in the conferences' *Proceedings*, or both. For more information, questions about format, media, hardcopy, e-mail, etc., please contact the person listed with the announcement. To date the following conference organizer has announced a call for papers for the forthcoming conference:

The **EME Conference 2006** will be held in Wuerzburg, Germany on August 25 to 27. Interested authors are invited to present a paper(s). Electronic submissions in Word97, Word2000, Acrobat5 (PDF), or text format will be accepted by e-mail or CD. Please ask if you are using another format.

If you are interested in writing and/or presenting a paper for the , send an e-mail to Rainer Allraun, DF6NA, at: <df6na@df6na.de>. Please contact him as soon as possible with an abstract or even a general idea. This will help the conference team with its planning activities. For more information about EME Conference 2006 go to: <http://www.eme2006.com>.

Current Meteor Showers

The *Draconids* is predicted to peak somewhere around 1600 UTC on October 8. The *Orionids* is predicted to peak on October 21. For more information on these meteor-shower predictions, visit the International Meteor Organization's URL: <http://www.imo.net>.

And Finally . . .

This month is full of opportunities for the weak-signal VHF operator. Contests and meteor showers highlight the opportunities, along with two conferences, AMSAT and Microwave Update. It is your responsibility to get involved and to get others involved as well. Please tell me about your activities and I will be happy to mention them here in a future column. I am looking forward to hearing from you about your exploits in the wonderful world of the VHF-plus ham bands.

73, Joe, N6CL

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propagation

BY TOMAS HOOD,* NW7US

High-Normal Conditions Predicted for CQ WW DX SSB Contest 2005

A Quick Look at Current Cycle 23 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, July 2005: 40
Twelve-month smoothed, January 2005: 35

10.7 cm Flux
Observed Monthly, July 2005: 97
Twelve-month smoothed, January 2005: 100

***Ap* Index**
Observed Monthly, July 2005: 16
Twelve-month smoothed, January 2005: 15

Radio enthusiasts on the HF bands celebrate the arrival of the winter DX season. From October through November 2005 we will see a steady improvement in the DX bands. During the CQ WW contests taking place in both months, we should experience fairly good success.

The 2005 CQ WW DX SSB Contest will start at 0000 UTC on Saturday, October 29 and run through 2359 UTC Sunday, October 30. Looking at the 27-day rotation of the sun, taking into consideration the current solar activity at the time of writing this column, propagation should be fair to excellent, depending on the radio signal path between you and the distant station, and the time of the attempted contact.

Predictions for one 27-day rotational period are far more accurate than for three 27-day rotational periods. Be sure to carefully check conditions on around October 2, since this would be one rotational period before the SSB contest weekend. There is better than a 90-percent chance that conditions observed on those days will recur during the October contest weekend.

See the "Last-Minute Forecast" for expected day-to-day conditions for the entire month of October. An updated day-to-day forecast for the SSB contest weekend will appear as a bulletin at the beginning of next month's column. November's issue should reach most subscribers before the SSB contest begins. You can also see an up-to-the day "Last-Minute Forecast" on my propagation resource center, at <http://prop.hfradio.org/>.

Table I tabulates the observed sunspot count during previous WW DX contest periods since 1994 and shows what is predicted for the 2005 contest. Contest conditions could be somewhat like those of 1994 and 1995. Low- to middle-latitude propagation paths should be fairly good, with openings even on 15 meters. With the low probability of geomagnetic disturbance during the contest weekend, the bands should be stable, and the lower frequency bands will be much quieter than the past few years.

The DX Propagation Charts and other information in this month's column are designed to help you make the most of propagation conditions during the contest, if you are participating. Even if you are not a dedicated contester, you should give it a try. If you are trying for your DXCC or other wallpaper, this is the contest of choice. Also, many die-hard partici-

*P.O. Box 213, Brinnon, WA 98320-0213
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LAST-MINUTE FORECAST

Day-to-Day Conditions Expected forOctober 2005

Expected Signal Quality Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 5-6, 13-16	A	A	B	C
High Normal: 2-3, 8-9, 21, 23-26 29-30	A	B	C	C-D
Low Normal: 1, 7, 10-12 17, 19-20, 22, 28	B	C-B	C-D	D-E
Below Normal: 4, 18, 31	C	C-D	D-E	E
Disturbed: 27	C-D	D	E	E

Where expected signal quality is:
A—Excellent opening, exceptionally strong, steady signals greater than S9.
B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D—Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.
E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.
2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be fair to good (C-B) on Oct. 1st, good (B) on the 2nd and 3rd, poor to fair (D-C) on the 4th, excellent (A) on the 5th and 6th, etc.

	1994	'95	'96	'97	'98	'99	2000	'01	'02	'03	'04	'05
Oct.	27	12	9	32	71	108	115	114	91	58	36	19*
Nov.	26	11	10	35	73	111	113	116	85	57	35	17*

**Predicted values expected during the 2005 contest.*

Table I– Smoothed sunspot numbers recorded during CQ World-Wide DX Contests since 1994 (October SSB, November CW).

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

October 15–December 15, 2005
Time Zone: EDT (24-Hour Time)
EASTERN USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	09-11 (1)	08-09 (1) 09-11 (3) 11-12 (2) 12-13 (1)	06-07 (1) 07-08 (2) 08-09 (4) 09-11 (3) 11-13 (4) 13-14 (3) 14-15 (2) 15-17 (1)	16-17 (1) 17-18 (2) 18-20 (3) 20-02 (2) 02-03 (3) 03-04 (2) 04-05 (1) 19-21 (1)* 21-23 (2)* 23-02 (3)* 02-03 (2)* 03-04 (1)*
Northern Europe & CIS	09-11 (1)	08-09 (1) 09-10 (2) 10-11 (1)	06-07 (1) 07-10 (3) 10-13 (2) 13-15 (1)	17-19 (1) 19-22 (2) 22-01 (1) 01-03 (2) 03-04 (1) 19-21 (1)* 21-01 (2)* 01-03 (1)*
Eastern Mediterranean & Middle East	08-10 (1)	08-09 (1) 09-11 (2) 11-12 (1)	06-10 (1) 10-12 (2) 12-15 (3) 15-16 (2) 16-18 (1)	18-20 (1) 20-00 (2) 00-02 (1) 20-22 (1)* 22-00 (2)* 00-01 (1)*
Western Africa	11-14 (1)	08-10 (1) 10-12 (2) 12-13 (3) 13-15 (4) 15-16 (2) 16-17 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	18-20 (1) 20-02 (2) 02-03 (1) 20-22 (1)* 22-01 (3)* 01-02 (1)*
Eastern & Central Africa	10-13 (1)	08-12 (1) 12-14 (2) 14-15 (1)	07-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	20-01 (1) 22-00 (1)*
Southern Africa	10-12 (1)	08-10 (1) 10-11 (2) 11-13 (3) 13-14 (2) 14-15 (1)	07-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1) 22-00 (1)	18-19 (1) 19-22 (2) 22-23 (1) 19-22 (1)*
Central & South Asia	*Nil*	09-11 (1) 17-19 (1)	07-08 (1) 08-10 (2) 10-12 (1) 19-21 (1)	05-07 (1) 18-21 (1) 05-07 (1)* 18-20 (1)*
Southeast Asia	*Nil*	17-19 (1)	07-08 (1) 08-10 (2) 10-13 (1) 18-21 (1)	05-07 (1) 18-20 (1) 05-07 (1)*
Far East	*Nil*	16-17 (1) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-11 (1) 16-19 (1) 19-21 (2) 21-22 (1)	04-08 (1) 17-19 (1) 05-07 (1)* 17-18 (1)*
South Pacific & New Zealand	12-16 (1)	12-14 (1) 14-15 (2) 15-16 (3) 16-18 (2) 18-19 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-11 (2) 11-17 (1) 17-18 (2) 18-20 (3) 20-22 (2) 22-01 (1)	23-00 (1) 00-02 (2) 02-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Australasia	14-16 (1)	10-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-20 (1) 20-23 (2) 23-01 (1)	02-05 (1) 05-07 (2) 07-08 (1) 04-05 (1)* 05-07 (2)* 07-08 (1)*
Caribbean, Central America & Northern Countries of South America	08-09 (1) 09-13 (2) 13-15 (1)	07-08 (1) 08-09 (2) 09-14 (3) 14-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	00-06 (1) 06-07 (2) 07-09 (4) 09-11 (3) 11-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2)	18-19 (1) 19-21 (3) 21-03 (4) 03-05 (3) 05-06 (2) 06-07 (1) 19-21 (1)* 21-01 (2)* 01-03 (3)* 04-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	10-15 (1)	07-08 (1) 08-10 (2) 10-13 (1) 13-14 (2) 14-16 (4) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-14 (1) 14-16 (2) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2) 00-02 (1)	20-22 (1) 22-04 (2) 04-06 (1) 21-23 (1)* 23-03 (2)* 03-04 (1)*
McMurdo Sound, Antarctica	*Nil*	08-10 (1) 13-15 (1) 15-16 (2) 16-17 (1)	16-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-00 (1) 06-08 (1)	03-06 (1)

Time Zones: CST & MST
(24-Hour Time)
CENTRAL USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	08-10 (1)	08-09 (1) 09-12 (2) 12-13 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-12 (2) 12-14 (3) 14-16 (2) 16-17 (1)	17-18 (1) 18-20 (3) 20-22 (2) 22-00 (1) 00-02 (2) 02-03 (1) 18-20 (1)* 20-00 (2)* 00-02 (1)*
Northern Europe & CIS	08-10 (1)	08-11 (1)	06-07 (1) 07-12 (2) 12-14 (1)	18-19 (1) 19-21 (2) 21-23 (1) 23-00 (2) 00-01 (1) 19-00 (1)*
Eastern Mediterranean & Middle East	08-10 (1)	09-11 (1)	06-10 (1) 10-12 (2) 12-14 (3) 14-15 (2) 15-17 (1)	18-20 (1) 20-23 (2) 23-00 (1) 20-23 (1)*
Western Africa	10-13 (1)	07-10 (1) 10-11 (2) 11-13 (3) 13-14 (2) 14-15 (1)	06-12 (1) 12-14 (2) 14-15 (3) 15-16 (4) 16-17 (2)	18-19 (1) 19-23 (2) 23-00 (1) 19-23 (1)*
Southern Africa	10-12 (1)	08-10 (1) 10-11 (2) 11-13 (3) 13-14 (2) 14-15 (1)	07-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1) 22-00 (1)	18-19 (1) 19-22 (2) 22-23 (1) 19-22 (1)*
Central & South Asia	*Nil*	09-11 (1) 17-19 (1)	07-08 (1) 08-10 (2) 10-12 (1) 19-21 (1)	05-07 (1) 18-21 (1) 05-07 (1)* 18-20 (1)*
Southeast Asia	*Nil*	17-19 (1)	07-08 (1) 08-10 (2) 10-13 (1) 18-21 (1)	05-07 (1) 18-20 (1) 05-07 (1)*
Far East	*Nil*	16-17 (1) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-11 (1) 16-19 (1) 19-21 (2) 21-22 (1)	04-08 (1) 17-19 (1) 05-07 (1)* 17-18 (1)*
South Pacific & New Zealand	12-16 (1)	12-14 (1) 14-15 (2) 15-16 (3) 16-18 (2) 18-19 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-11 (2) 11-17 (1) 17-18 (2) 18-20 (3) 20-22 (2) 22-01 (1)	23-00 (1) 00-02 (2) 02-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Australasia	14-16 (1)	10-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-20 (1) 20-23 (2) 23-01 (1)	02-05 (1) 05-07 (2) 07-08 (1) 04-05 (1)* 05-07 (2)* 07-08 (1)*
Caribbean, Central America & Northern Countries of South America	08-09 (1) 09-13 (2) 13-15 (1)	07-08 (1) 08-09 (2) 09-14 (3) 14-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	00-06 (1) 06-07 (2) 07-09 (4) 09-11 (3) 11-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2)	18-19 (1) 19-21 (3) 21-03 (4) 03-05 (3) 05-06 (2) 06-07 (1) 19-21 (1)* 21-01 (2)* 01-03 (3)* 04-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	10-15 (1)	07-08 (1) 08-10 (2) 10-13 (1) 13-14 (2) 14-16 (4) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-14 (1) 14-16 (2) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2) 00-02 (1)	20-22 (1) 22-04 (2) 04-06 (1) 21-23 (1)* 23-03 (2)* 03-04 (1)*
McMurdo Sound, Antarctica	*Nil*	08-10 (1) 13-15 (1) 15-16 (2) 16-17 (1)	16-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-00 (1) 06-08 (1)	03-06 (1)

		14-15 (1)	16-17 (3) 17-18 (2) 18-19 (1)	
Eastern & Central Africa	09-12 (1)	08-11 (1) 11-13 (2) 13-14 (1)	07-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	20-00 (1) 21-23 (1)*
Southern Africa	09-12 (1)	07-10 (1) 10-11 (2) 11-12 (3) 12-13 (2) 13-14 (1)	21-23 (1) 07-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	18-19 (1) 19-22 (2) 22-23 (1) 19-22 (1)*
Central & South Asia	*Nil*	17-19 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-18 (1) 18-20 (2) 20-21 (1)	05-08 (1) 18-20 (1) 05-07 (1)* 18-20 (1)*
Southeast Asia	*Nil*	14-16 (1) 16-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-14 (1) 18-19 (1) 19-21 (2) 21-22 (1)	04-07 (1) 17-19 (1) 05-07 (1)*
Far East	16-18 (1)	15-16 (1) 16-18 (2) 18-19 (1)	07-08 (1) 08-10 (3) 10-11 (2) 11-12 (1) 16-18 (1) 18-20 (2) 20-22 (1)	01-02 (1) 02-04 (2) 04-06 (1) 06-08 (2) 08-09 (1) 02-03 (1)* 03-05 (2)* 05-07 (1)*
South Pacific & New Zealand	12-17 (1)	10-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	06-07 (1) 07-09 (3) 09-12 (2) 12-17 (1) 17-18 (2) 18-20 (3) 20-22 (2) 22-00 (1)	23-01 (1) 01-02 (2) 02-07 (3) 07-08 (2) 08-09 (1) 00-02 (1)* 02-07 (2)* 07-08 (1)*
Australasia	14-17 (1)	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	05-07 (1) 07-08 (2) 08-10 (2) 10-11 (2) 11-15 (1) 15-17 (2) 17-19 (1) 19-20 (2) 20-22 (3) 22-00 (2) 00-02 (1)	02-04 (1) 04-08 (2) 08-09 (1) 03-04 (1)* 04-07 (2)* 07-08 (1)*
Caribbean, Central America & Northern Countries of South America	08-09 (1) 09-14 (2) 14-16 (1)	07-08 (1) 08-09 (2) 09-14 (3) 14-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	00-06 (1) 06-07 (2) 07-09 (4) 09-11 (3) 11-13 (2) 13-15 (3) 15-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2)	18-19 (1) 19-20 (2) 20-21 (3) 21-03 (4) 03-05 (3) 05-07 (2) 07-08 (1) 19-21 (1)* 21-00 (2)* 00-03 (3)* 03-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	09-15 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-15 (3) 15-16 (4) 16-17 (2) 17-18 (1)	00-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2)	19-21 (1) 21-01 (2) 01-03 (1) 03-05 (2) 05-06 (1) 21-23 (1)* 23-01 (2)* 01-03 (1)*
McMurdo Sound, Antarctica	*Nil*	07-09 (1) 13-15 (1) 15-17 (2) 17-18 (1)	06-08 (1) 15-17 (1) 17-19 (2) 19-22 (3) 22-00 (2) 00-01 (1)	03-06 (1)

Time Zone: PST
(24-Hour Time)
WESTERN USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	08-10 (1)	07-08 (1) 08-10 (2) 10-12 (1)	06-07 (1) 07-09 (2) 09-10 (1) 10-14 (2) 14-16 (1) 23-01 (1)	18-20 (1) 20-22 (2) 22-00 (1) 19-23 (1)*
Northern Europe	*Nil*	07-10 (1)	06-07 (1) 07-11 (2)	21-00 (1) 21-23 (1)*

& CIS			11-13 (1) 23-01 (1)	
Eastern Mediter-ranean & Middle East	*Nil*	07-10 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-15 (1) 21-23 (1)	18-22 (1) 06-08 (1)
Western Africa	09-11 (1)	08-10 (1) 10-11 (2) 11-12 (3) 12-13 (2) 13-14 (1)	07-10 (1) 10-14 (2) 14-16 (3) 16-17 (2) 17-18 (1) 22-00 (1)	18-23 (1) 19-22 (1)*
Eastern & Central Africa	*Nil*	09-12 (1)	06-09 (1) 11-13 (1) 13-16 (2) 16-18 (1) 21-23 (1)	18-21 (1) 06-08 (1)
Southern Africa	08-12 (1)	08-10 (1) 10-13 (2) 13-14 (1)	07-09 (1) 11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1) 23-01 (1)	18-19 (1) 19-20 (2) 20-21 (1) 06-08 (1) 18-20 (1)*
Central & South Asia	*Nil*	17-19 (1)	07-08 (1) 08-09 (2) 09-11 (1) 16-17 (1) 17-18 (2) 18-19 (1)	04-06 (1) 06-08 (2) 08-09 (1) 05-07 (1)*
Southeast Asia	15-17 (1)	14-15 (1) 15-17 (2) 17-18 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-20 (2) 20-22 (1)	02-03 (1) 03-06 (2) 06-08 (1) 03-07 (1)*
Far East	14-16 (1)	13-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-16 (1) 16-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	22-00 (1) 00-02 (2) 02-07 (3) 07-08 (2) 08-09 (1) 23-01 (1)* 01-05 (2)* 05-07 (1)*
South Pacific & New Zealand	12-14 (1) 14-16 (2) 16-17 (1)	09-12 (1) 12-15 (2) 15-17 (4) 17-18 (2) 18-19 (1)	04-07 (1) 07-09 (3) 09-12 (2) 12-16 (1) 16-17 (2) 17-18 (3) 18-20 (4)	21-22 (1) 22-05 (3) 05-08 (2) 08-09 (1) 22-00 (1)* 00-06 (2)* 06-07 (1)*
			20-22 (2) 22-02 (1) 02-04 (2)	
Australasia	15-17 (1)	11-12 (1) 12-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	12-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-03 (1) 03-05 (2) 05-07 (1) 07-10 (3) 10-12 (2)	02-03 (1) 03-04 (2) 04-07 (3) 07-08 (2) 08-09 (1) 03-04 (1)* 04-07 (2)* 07-08 (1)*
Caribbean, Central America & Northern Countries of South America	08-10 (1) 10-14 (2) 14-15 (1)	07-08 (1) 08-11 (2) 11-13 (3) 13-15 (4) 15-16 (2) 16-17 (1)	00-05 (1) 05-06 (2) 06-08 (3) 08-09 (4) 09-10 (3) 10-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-22 (1) 22-00 (2)	18-19 (1) 19-20 (2) 20-03 (3) 03-04 (2) 04-06 (1) 19-22 (1)* 22-02 (2)* 02-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	09-14 (1)	07-08 (1) 08-09 (2) 09-13 (1) 13-14 (2) 14-15 (4) 15-16 (3) 16-17 (1)	01-06 (1) 06-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-01 (2)	19-21 (1) 21-03 (2) 03-05 (1) 20-23 (1)* 23-01 (2)* 01-02 (1)*
McMurdo Sound, Antarctica	Nil	08-10 (1) 13-15 (1) 15-16 (2) 16-18 (1)	07-09 (1) 17-19 (1) 19-20 (2) 20-22 (3) 22-00 (2) 00-02 (1)	23-02 (1) 02-05 (2) 05-06 (1) 02-05 (1)*

* Indicates best time for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.
For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
For 30 meter openings interpolate between 40 and 20 meter openings.

Propagation charts prepared by George Jacobs, W3ASK.

pants will appreciate putting you in their log. Sure, conditions may not be as hot as during the years of the solar cycle maximum, but with the improvement of propagation on lower HF bands such as 40 meters, there's a lot of opportunity to make a good score.

The 2005 CQ WW CW Contest will be from 0000 UTC, Saturday, November 26 through 2359 UTC Sunday, November 27. We'll look at the forecast for that weekend in next month's column.

October Propagation

The following is a band-by-band summary of DX propagation conditions expected from mid-October through mid-December and centered on the two WW contest weekends. Next month's column will update this summary.

160 Meters: Considerably decreased static levels, quieter geomagnetic conditions (as compared to the last few years), and longer hours of darkness in the northern latitudes should provide a number of DX openings on this band. These openings will often be weak due to the relatively high signal absorption, since we are not yet to the longest periods of daily darkness. However, give this band a try, as some fairly good openings should be possible toward Europe and the south from the eastern half of the United States, and toward the south, the Far East, Australasia, and the South Pacific from the western half of the country. Other DX openings might also be possible. The best propagation aid for this band (and for 80 and 40 meters as well) is a set of sunrise and sunset curves, since DX signals tend to peak when it is local sunrise at the easterly end of the path. A good internet website featuring a grayline map display is found at <http://www.fourmilab.to/earthview/>. Follow the link "map of the Earth," which shows the day and night regions.

80 Meters: This should be a good band for DX openings to many areas of the world during the hours of darkness and into the sunrise period. The band should peak towards Europe and in a generally easterly direction around midnight. For openings in a generally western direction, expect a peak just after sunrise. The band should remain open toward the south throughout most of the night. Propagation on this band is quite similar to that expected on 40 meters, except that signals will be somewhat weaker on the average, noise levels will be a bit higher, and the period for band openings in a particular direction will be a bit shorter.

40 Meters: This should be the hottest DX band during the hours of darkness, as the seasonal static levels are lower than they were during the summer. The band should be open first for DX toward Europe and the east during the late afternoon. Signals should increase in intensity as darkness approaches. During the hours of darkness expect good DX openings to most areas of the world. Signals should peak from an easterly direction about midnight and from a westerly direction just after sunrise. Excellent openings toward the south should be possible throughout most of the nighttime period. With conditions Above Normal or High Normal, the choice for best nighttime band will be between the 40- and 20-meter bands.

20 Meters: DX openings should be possible on this band both day and night. Conditions should peak from about an hour or two after sunrise and again during the late afternoon and early evening hours. Expect to work into most areas of the world between sunrise and sunset. Good to excellent openings should be possible to many areas of the world well into the hours of darkness as well. When conditions are Above Normal, expect 20 meters to remain open for worldwide DX during most of the night. Look for long-path openings for about an hour or so after sunrise and again for an hour or so before local sunset. Signal levels are expected to be exceptionally strong during the October contest period. If you plan on operating on a single-band effort during the SSB WW DX Contest, this band should be your choice.

15 Meters: This year 15 meters will not be as hot as the previous few years. However, during the daylight hours this band should still see some significant action. Fair to good conditions are expected from shortly after sunrise through the early evening hours. The band could remain open into the evening toward southern and tropical areas.

10 Meters: For those in low- and middle-latitude locations this band could

yield a number of daytime contacts during the contest weekends, especially between points in the southern hemisphere, and along paths crossing the equator. However, I don't expect too much excitement on this band. With the continued decline in solar activity, this band suffers. Those in the Caribbean and other tropical regions will find 10 meters a possibly usable band this year.

Contest Work Charts

The DX Propagation Charts in this issue show the times when each amateur band from 160 through 10 meters is expected to open from each time zone area in the continental U.S. to the major DX areas in the world. The information contained in these charts, while useful during the contest period in their present format, can easily be reorganized into more operational work plans or schedules. Experience gained during previous contests has shown that specifically tailored schedules derived from the charts can be extremely useful in piling up contacts and points with a minimum of wasted time.

Table II is an example courtesy of George Jacobs (who wrote this column for 50 years until December 2001, without missing a single issue!) of one of several types of plans that can be devised. It is a multi-band operational work plan that shows the times and bands when propagation conditions are expected to be optimal to various areas of the world for each two-hour period throughout the day. An eastern QTH has been chosen for this example, but similar plans can be devised for central and western locations. This example is not accurate, though, for this year.

VHF Conditions

Sporadic-*E* activity is very rare during October in the northern temperate zone (where much of the U.S. is located). While the contest weekend looks like a quiet period, there are a few days forecast with high geomagnetic activity and possible radio storms. It is possible to have a few aurora-mode (Au) propagation events during October. Remember that digital modes and CW are the best way to go with aurora, particularly on 144 MHz through 432 MHz, as the voice modes become extremely distorted and unrecognizable due to the effects of the aurora. The best times to check for VHF aurora openings are when conditions are expected to be Below Normal or Disturbed, as shown in the "Last-Minute Forecast" at the beginning of this column.

There is some possibility of extended tropospheric conditions during October because of the changing weather patterns. Two meters is the best band to watch for this.

October does have the *Draconids* meteor shower, active between October 6 and 10, and expected to peak on October 8. The shower could reach a very high rate of hourly meteors. As with the *Leonids,* the best time to check for radio propagation would be from about midnight onward until dawn.

The *Draconids* is primarily a periodic shower that has twice produced spectacular, brief meteor storms in the last century—in 1933 and 1946. In 1999 a wholly unexpected minor outburst was witnessed in the Far East. *Draconid* meteors are exceptionally slow moving, a characteristic that helps separate genuine shower meteors. This shower could produce meteor-scatter mode (Ms) propagation openings on VHF and UHF.

You might also check out the *Orionids* shower, which is expected to peak on October 21 with an expected visual rate of 20 meteors per hour. This shower could also provide a few strong ionized trails, making meteor-shower propagation possible. Check out <http://www.imo.net/calendar/cal05.html> for a complete calendar of meteor showers in 2005.

Useful Websites (URLs)

One great resource you can utilize during a contest is the internet. Real-time solar, geomagnetic, ionospheric, and HF propagation prediction information is right at your fingertips, allowing you to better plan your on-the-air operation.

If you want to be alerted any time the *Kp*-index rises above 4, or the solar flux changes, and so on, then you will want to subscribe to my propagation eAlert service (a free resource). If you have a pager, a cell phone with e-mail features, or an open e-mail client on your contest computer, these eAlerts will let you know when conditions are changing. Direct your web-browser software to view the eAlert subscription page at <http://prop.hfradio.org/ealert/>. When you fill out the form, enter the e-mail address you will use to receive these eAlerts.

In addition, I now have an RSS feed that you can use to keep tabs on all of the critical space weather and propagation observations collected on my propagation web center. Simply configure your RSS reader to poll the dynamic content at <http://hfradio.org/propsupport/prop.rss>.

If you are located where you do not have easy internet access, but you have a WAP/WML wireless device, you may gather the latest propagation information, warnings, alerts, and a look at conditions by pointing your WAP device to <http://wap.hfradio.org/>. This is a special URL for wireless access to this free resource.

If you have live internet connectivity at your contest location, use the following websites, which provide real-time data, forecasts, links to in-depth historical datum, and graphical content:

The NW7US Propagation Center: <http://prop.hfradio.org/>. This site provides a rich collection of live propagation information. In addition, you will find a lot of links to educational resources covering the science of propagation, links to the many space and earth science resources found around the world, forecasts, and archived analysis and data.

D-Region Absorption Prediction: This is a great resource for those times when you want to know if the

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lower bands are experiencing degradation due to solar activity. <http://sec.noaa.gov/rt_plots/ dregion.html> is updated once every minute. Long-range communications using high-frequency radio waves depend on reflection of the signals in the ionosphere. Along the path to the *F2* peak the radio-wave signal suffers attenuation due to absorption by the intervening ionosphere. This site shows current and forecast conditions of the ionospheric *D*-Layer, which has direct influence on the ability of your contest signal reaching its destination.

160-Meter Radio Propagation Prediction Table: <http://solar.spacew.com/www/160pred.html>. Don't miss this page. It is based upon selected high-latitude magnetic observatory data that is used to estimate the influence of the auroral oval on 160-meter path propagation. Refer to the March and April 1998 issues of *CQ* magazine for details: "160 Meters: An Enigma Shrouded in Mystery," by Cary Oler and Ted Cohen, N4XX.

The Solar Terrestrial Activity Report from the DX-Listeners' Club in Norway: <http://www.dxlc.com/solar/>. The Solar Terrestrial Activity Report generally is updated once a day. The report contains a graphical view of the last three months of solar-flux values, sunspot count, and planetary *A*-index. In addition, there is information on recent solar events as well as a forecast for the next few days. Charts of all sunspot cycles from cycle one are available, as well as comparisons of the most recent cycle with previous cycles.

I*PS Radio and Space Services from Australia:* The Australian Space Weather Agency presents <http://www.ips.gov.au/>. Following the "Space Weather," "Geophysical," "Solar," or "HF Systems" links brings you to a wealth of live data resources.

You can dial each URL directly, and you can find additional links at my page <http://prop.hfradio.org/>. If you do not have access to the World Wide Web (try a local library or school), solar flux, geomagnetic indices, and ionospheric reports can be obtained by calling 303-497-3235, where a recorded announcement is updated every three hours. Both the Space Environmental Center and the U.S. Air Force Space Weather Program staff encourage radio amateurs to either call the recorded line, or to use WWV (Fort Collins, Colorado) at 18 minutes past each hour. WWV transmits the solar and geomagnetic information, storm updates, and other items of concern to radio users. The frequencies are 2.5, 5, 10, 15, and 20 MHz. Sister station WWVH is located in Kauai, Hawaii, and carries the same information at the same times, on the same frequencies.

Time EST	Optimum Band (meters)	Areas To Which Band Is To Be Open
00–02	40	Most of Europe, Eastern Mediterranean, and Middle East. Most of Central and South America. A few African areas and possibly Antarctica.
02–04	20	Some South Pacific, New Zealand, and Australasia. A few Far East and Asian areas. Some South America and Antarctica.
04–06	40	South Pacific, New Zealand, Australasia. Many South American areas. A few Far Eastern and Asian areas. Possibly Antarctica.
06–08	20	Most of Europe, South Pacific, New Zealand, and Australasia. Most of Central and South America. A few African areas. Some Far East and Asian areas.
08–10	15	All of Europe, Eastern Mediterranean, and Middle East. Some of Africa. Most of Central and South America. South Pacific, New Zealand, and Australasia. A few Asian areas.
10–12	10	Most of Europe and Africa. Most of Central and South America. A few Asian areas, New Zealand, South Pacific, and Australasia.
12–14	15	Some of Europe and most of Africa. Most of Central and South America. A few areas of the South Pacific, New Zealand, and Australasia.
14–16	15	Most of Africa, and Central and South America. Some of South Pacific, New Zealand, and Australasia. A few Asian areas.
16–18	20	Most of Europe, Eastern Mediterranean, and Middle East. All of Africa, and Central and South America. A few Australasian areas.
18–20	15	Lots of South Pacific, New Zealand, and Australasia. Some of Far East and Asia. Most of Central and South America. Possibly Antarctica.
20–22	20	Most of Africa, Far East, South Pacific, New Zealand. Australasia, Central and South America. A few European areas and Middle East. Some Antarctica.
22–00	20	Lots of Far East, South Pacific, New Zealand, Australasia, Central and South America. A few African and Asian areas. Antarctica.

**Similar work plans can be devised for single-band operation or for openings to specific DX areas.*

Table II– Sample multi-band work plan for eastern U.S. QTH. (Courtesy of George Jacobs, W3ASK)

Current Solar Cycle Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 96.6 for July 2005, just a bit higher than June's 93.7. The 12-month smoothed 10.7-cm flux centered on January 2005 is 100.3. The predicted smoothed 10.7-cm solar flux for October 2005 is about 79, give or take about 17 points.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for July 2005 is 39.9, up from June's 39.6, but still lower than May's 42.6. The lowest daily sunspot value during July 2005 was zero, occurring three days— July 18, 20, and 21. The highest daily sunspot count for July was 107 on July 4. The 12-month running smoothed sunspot number centered on January 2005 is 34.7. A smoothed sunspot count of 19 is expected for October 2005, give or take about 12 points.

The observed monthly mean planetary *A*-index (*Ap*) for July 2005 is 16. The 12-month smoothed *Ap*-index centered on January 2005 is 14.7. Expect the overall geomagnetic activity to be quiet during most days in October, with possibly one major storm during the month. Refer to the "Last-Minute Forecast" for the outlook on what days that this might occur.

Summary

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may e-mail me, write me a letter, or catch me on the HF amateur bands. Please come and participate in my online propagation discussion forum at <http://hfradio.org/forums/>. See you on the air, perhaps during the contest weekend!

73, Tomas, NW7US/AAAØWA

with its pool of more than 400 questions, is simply too big and too complex for a typical teenager today. Those teens who are most likely to be interested in ham radio are also likely to be taking honors-level courses at school with homework loads that are unbelievable by their parents' and grandparents' standards. They simply can't fit in studying more than 1000 questions for a ham test. In addition, understanding some of the concepts, particularly for the General exam, is beyond all but the brightest high school students.

If we hope to attract a meaningful number of young people to amateur radio, we need to restore an entry-level license that grants HF as well as VHF privileges, and that does not involve the need to study hundreds and hundreds of questions. The FCC justifies its refusal to consider a new entry-level license on the statement that "most of the petitioners in this proceeding request, *either implicitly or explicitly* (emphasis added), that the license structure retain three classes of operator licenses..." In other words, if you didn't specifically comment on the proposals for an additional entry-level license class, then you *implicitly* voted in favor of maintaining the status quo. We feel that is an unfair reading and interpretation of the comments.

Technician Limbo

The next, bigger, problem is that the NPRM is confusing on whether current Technicians will gain access to the HF Novice bands if the code exam is dropped. In denying several petitions which sought limited HF privileges for Technicians, the Commission notes that its pending "Phone Band Expansion NPRM" (WT Docket 04-140) would significantly increase privileges for Techs-with-code, and that combined with the privileges sought by the petitioners here, the net result "would be to authorize Technician Class licensees significantly more spectrum in the HF bands than the petitioners request." The discussion goes on to say that since additional frequency and mode privileges "are major incentives for licensees to upgrade ... and we do not want to diminish this incentive, we conclude that it would *not* be in the public interest to propose authorizing additional HF frequency privileges to Technician Class licensees." Whether or not you agree with that reasoning, it still leaves open the question of what to do about *current* HF privileges for *some* Technicians.

Right now, Technicians who have passed the 5 wpm code test have access to Novice HF privileges—CW on parts of 80, 40, and 15 meters, and CW, voice and data on part of 10 meters. Techs who have not passed the code test have no HF privileges. In the FCC's eyes, at least since 2000, both groups are lumped together as Technician Class licensees. For which group of Techs are these "additional HF frequency privileges" being discussed? Those who currently have none? The only thing separating the Techs-with-code from "regular" Techs is the 5 wpm code test—which the FCC now proposes to eliminate. It would become impossible for a current codeless Tech to take that 5 wpm test and gain Novice/Tech+ HF privileges.

What the Commission now appears to be proposing is to *take away the only entry-level access to HF that we currently have*. There is an assumption that it is easy to pass the General Class written exam; easier, in fact, than passing a 5 wpm code test. For some people, that may indeed be true. But for others, just the opposite is true. The General Class written test is *not* easy, particularly if math is not your strong suit. For many Techs, passing the code test provides an easier path to HF privileges than passing the General written exam. But what the Commission appears to be saying is that, if you want to get on HF, you'll have to become a General. *For many people, this proposal will make it more difficult, not less, to gain basic HF operating privileges.*

And what would become of all those Techs who have passed their code tests and currently enjoy Novice HF privileges? Would they lose them? Highly doubtful. The FCC is still smarting from the near-revolt after its incentive licensing decision four decades ago took away privileges from thousands of hams, and is very gun-shy about taking away privileges from anyone.

But if some Techs enjoy limited HF privileges based on passing a code test that the FCC wants to eliminate, what, then, would be the justification for barring "regular" Technicians from enjoying those same HF privileges? The only difference between them would be a code test that is no longer required or available.

Past FCC practice suggests there would be no justification for continued separation. Technicians licensed before 1987, who passed the General theory exam and a 5 wpm code test, were permitted to apply for no-test upgrades when the speed of the General code test was lowered from 13 to 5 wpm in 2000, since they had already passed all current requirements for General. Former Novices are given lifetime code test credit, so if they pass today's Technician exam, they automatically gain Tech-with-code HF privileges along with standard Technician VHF/UHF privileges. The same logic ought to apply to current Technicians, who—once the code test is eliminated—will have the same qualifications as their fellow Techs who have passed a code exam because that exam will no longer be required for access to HF and neither will have passed the General written exam. The NPRM is confusing and the final Report & Order will need to clarify (as well as justify) the situation.

Bottom Line

We agree with the proposal to eliminate the code exam for General Class but see no need to make any changes to the Extra Class requirements. We *do* see a need to provide limited access to HF without having to upgrade to General, *as is now the case*. The FCC ought to either reconsider its stance on a new entry-level license, or at the very least, give all Technicians the HF privileges now enjoyed by those Techs who have passed a code test.

The next assignment would then fall to the Question Pool Committee of the National Council of Volunteer Examiner Coordinators. The NCVEC was one of the groups proposing a new entry-level license, so it is clearly prepared to design a new entry-level exam. If the Commission is unwilling to create a new entry-level license, then the QPC must re-engineer the Technician exam to achieve two major goals while remembering that the purpose of license exams, as stated by the FCC in this NPRM, "*is not to determine whether a person has achieved a particular level of skill, but rather to determine whether an individual can properly operate an amateur station*":

1) Include the basic "rules of the road" for HF as well as VHF operating (assuming that the FCC grants limited HF privileges to all Technicians); and

2) Develop a shorter exam with a smaller question pool that will not be as overwhelming as the current Technician pool while still meeting the requirement of determining whether an individual can properly operate an amateur station.

Overall, the FCC should listen to the consensus of the amateur community and should not, under any circumstances, for the first time in more than 50 years, make the General Class the "entry-level" license for HF.

73, W2VU

in a couple of 100 Hz of each other. You don't have to match ten crystals, only six and then four.

The AGC Circuit

The AGC circuit in most home-brew and kit-built receivers is treated like your poor relations of urban legend. Little attention or resources are given to them. Most of these circuits would be better replaced by an IF gain control. An AGC circuit should hold the audio output to within 6 dB and be transparent to the user. The dynamic range of the AGC should be near 100 dB. These are my specs and they aren't always possible, and yours may be different.

I spent six months trying to develop a good audio-derived AGC but gave up when I thought the delay in an audio-derived AGC control loop was too long. I then switched to an IF-derived AGC system and learned many more ways to not implement an AGC circuit. The AGC in this receiver uses these hard-learned lessons to give us a satisfactory AGC. These guidelines can be useful in new designs and may show you why an existing circuit is a problem.

First and most important, there should be no gain in that part of the AGC loop from the first integrator diode to resistors R11 and R14, which feed the AGC control voltage to the ICs. All signals up to the diode are 9-MHz sine waves and fairly clean. Any signal past the diode can be a sine wave, square wave, triangular wave, or somewhere in between with their attendant harmonics. This portion of the loop is where transients and parasitics develop due to random pulses and during the time the AGC control voltage goes from resting to a higher voltage during first keydown in a CW transmission or to VOX turn-on of a transmitter. With gain in this direct-coupled zone, these pulses can be amplified, and if they happen to coincide in phase with another pulse entering the chain, the circuit will act as though it has even more gain and the entire control loop will become regenerative or oscillate briefly. This is where the infamous clicks and pops occur that completely cut off the IFs. With unity gain in this direct-coupled area, this seldom occurs.

To provide the AGC loop gain needed here, I use another MC1350P. I know I can get 40 dB of stable gain from this chip if I properly decouple it and match the in/out impedances. A Darlington pair might work here, but I'm not sure of its stability.

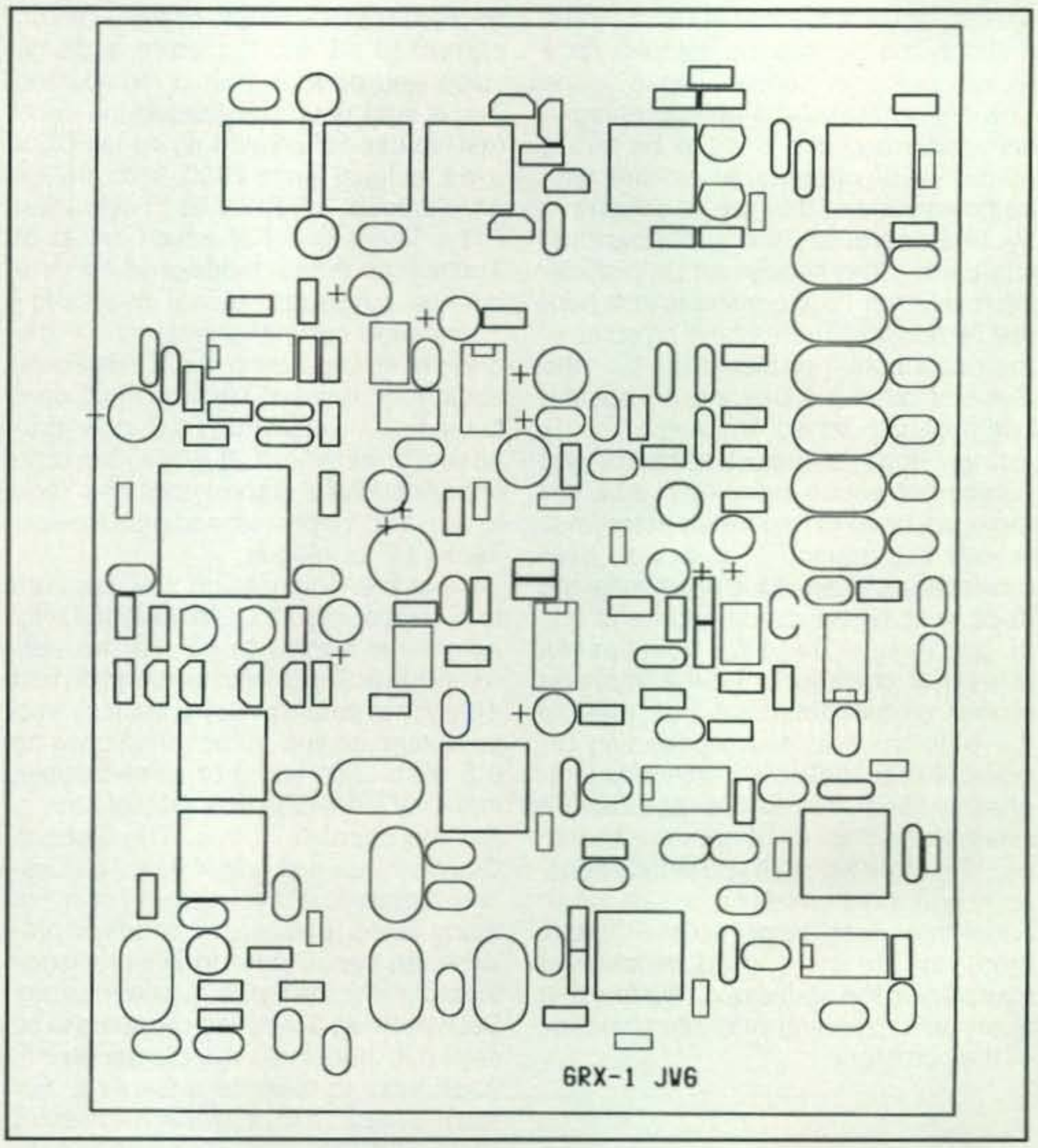

Fig. 3– Silkscreening template for top of circuit board.

The AGC amplifier output is developed across pot R24, which also provides the resting AGC reference voltage of about 5.6 volts needed at the cathode junction of D5, D6, and R19. This DC reference voltage is about 3 dB down on the voltage versus loss curve of the MC13 5 OP AGC curve, and 7 volts here will give you unity gain from this chip. D9, R22, and C28 look like an AM detector circuit, which they are. With no carrier for AM present, the circuit is a peak detector in its use. You will notice that C28 is only .01 µF. This allows both the analogue of absolute signal strength and the analogue of the variations of that strength to be present across C28. These two pieces of information are separated in time and are necessary for the AGC circuit to operate properly. This is the reason for using two integrators in this AGC circuit.

If we had only one integrator and C28 had the 2.2 µF value of capacitor C27, we would lose most of the analogue of the absolute signal strength through the low XC of C28. The analogue of the QSB is ten or more times longer in time than the absolute-signal-strength analogue and would be retained. However, the *true relationship* between the QSB analogue and the signal-strength analogue has been lost. This is where the trouble starts; the AGC control signal must now be increased to compensate for the loss in the absolute-signal-strength analogue. If this is done by using gain in the direct-coupled circuits, then the problems of parasitics and transients arise. The QSB analogue will also be amplified along with the AGC control signal and now *all true relationship* to the received signal is lost. The AGC is a negative feedback servo loop and can compensate for a lot of circuit induced error, but in doing so, I *think* the voice pattern of individuals is distorted by the AGC system.

Happily, C28 is .01 µF, and with R22 at 1 meg the IF signal can translate down into an audio-frequency signal with the analogues of both QSB and signal strength intact. This signal enters the high-impedance non-inverting input of U3A used here as a unity-gain volt-

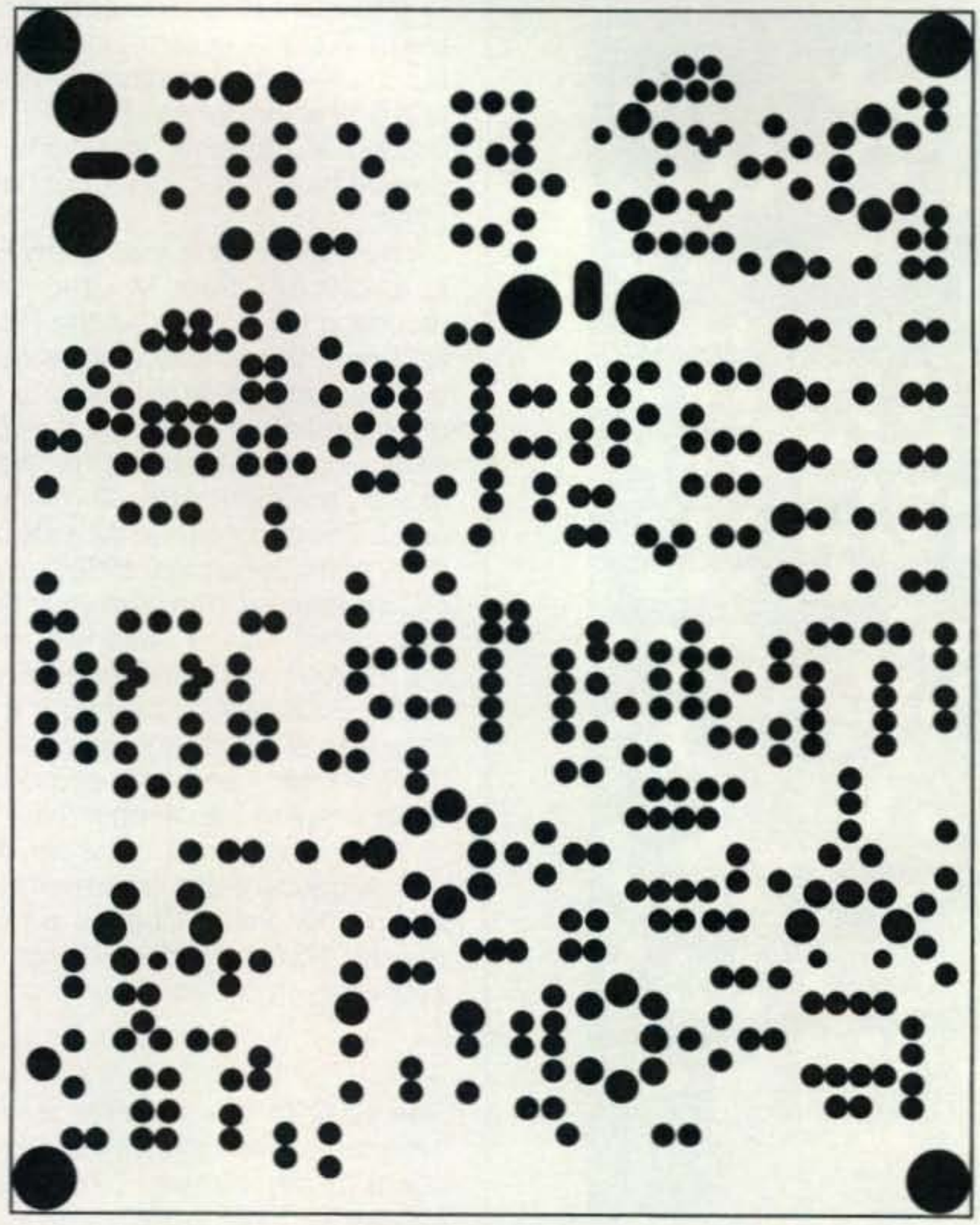

Fig. 4– Solder mask for both top and bottom of circuit board.

age follower. This op-amp isolates the two integrators and drives the second integrator.

In the second integrator the two analogues are translated down to near DC level and are combined into a varying DC voltage that represents the instantaneous signal level varying at the rate of whatever QSB conditions exist. This voltage goes to the non-inverting input of U3B, also used as a unity gain voltage follower. The output of U3B is a directly usable AGC control voltage and feeds the IF amplifiers through isolating diode D6 and current limiting resistors R11 and R14.

A *very* important resistor, R21, has not been mentioned so far. This 2.2K-ohm resistor limits current to the 2.2-µF C27 during fast-rising wave fronts such as first key-down in a CW or a VOX-keyed transmission. The large inrush of current into C27 at this time will cause the driving voltage from U3B to drop to near zero and diode D7 will turn off. With D7 turned off, the voltage from U3B will again rise and turn on D7. Another inrush of current and D7 again turns off. This continues until C27 accumulates sufficient charge to reduce the current inrush. This can be seen on an oscilloscope as a stairstep leading-edge waveform.

D7 is a switching diode that operates at nano-second speeds in this millisecond environment. The stray inductance and capacitance of the PC board and components on the board can be excited by this stairstep switching all the way up to VHF frequencies. With any gain in this circuit these normally damped ringing parasitics would be disastrous. Without gain they can still cause problems. R21 limits any current inrush to eliminate this problem.

R16, R17, and R18 form a divider string to give us manual control of IF gain. The pot is always in the control circuit and works whether the AGC is on or off. If you use an S-meter with this receiver, the control must be turned clockwise for the S-meter reading to be true. I leave my control at max, as the IP3 of this receiver allows this.

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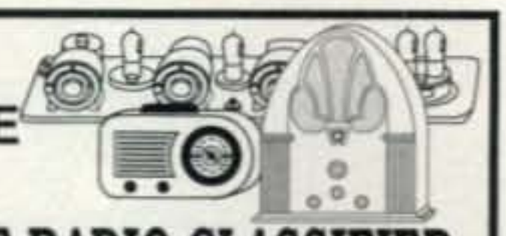

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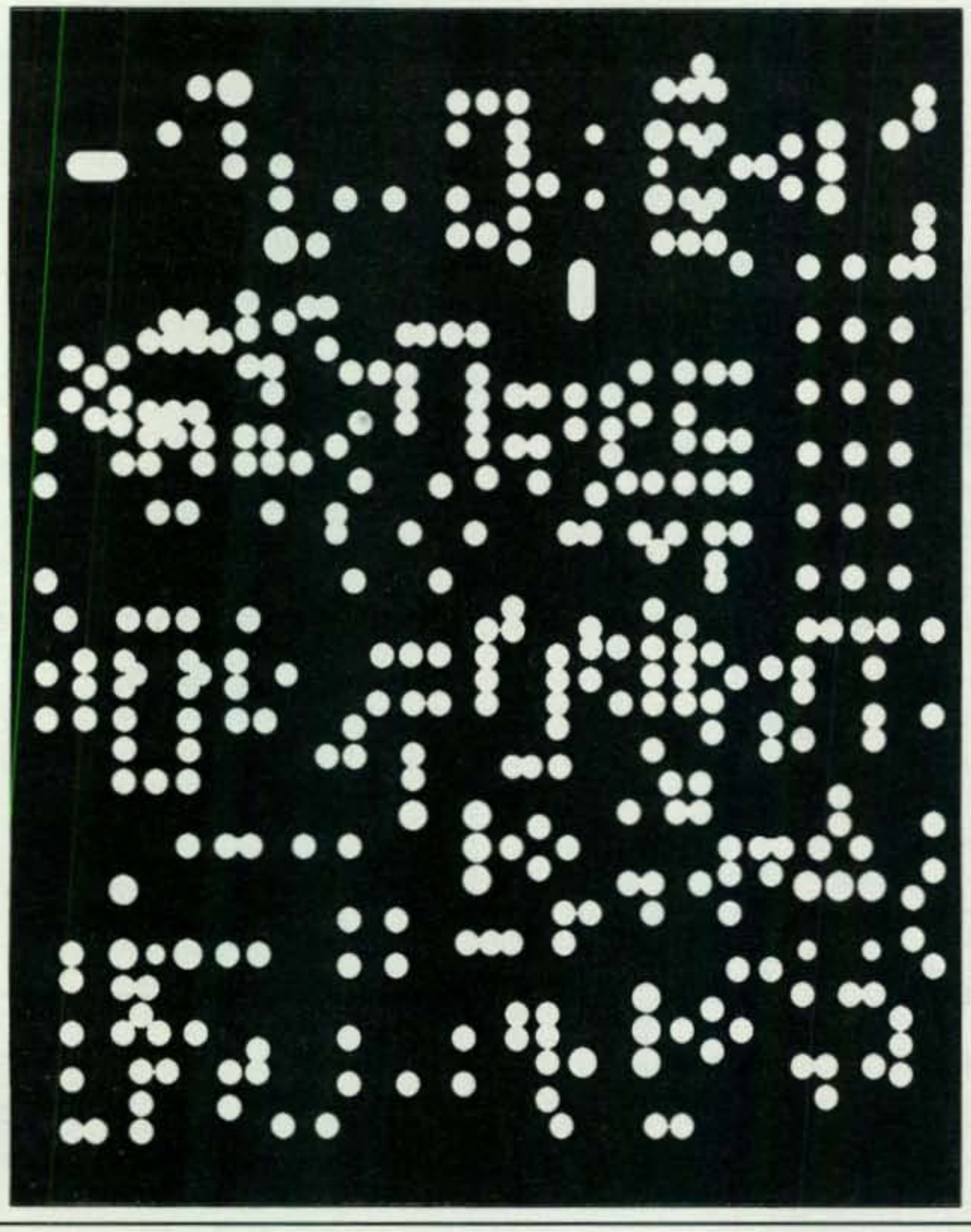

Fig. 5– Etching template for top of circuit board.

This circuit works well, but in retrospect I think an audio-derived AGC could be built using this circuit from R21 to R11 and R14. All the problems I had with the audio-derived AGC were also present in the IF-derived AGC. This means they were not caused by AGC loop delay. By using no gain in the direct-coupled circuits and using R21 to limit the current to C27, most of the problems were solved. R11 and R14 are 15K ohms, much larger than the 4.7K ohms normally used here. With 4.7K current-limiting resistors the IFs will cut off with strong signal input. With 15K ohms the IFs will not cut off, but will give smooth AGC control even with the strongest signals.

The Demodulator Circuit

The demod circuit is the same as the mixer circuit with two exceptions. I put the BFO in the far corner of the board to get it as far away from other circuits as possible. The shortest route from the BFO to the demod on the PC board is to the center tap of the balun in the demod input. The IF signal is still fed in push-pull and the BFO is still injected serially, but at the same point. In the mixer circuit I fed the VFO into the mixing medium away from the input signal for better isolation. The crystal-controlled BFO has less phase noise than the analogue VFO I use, and the signal has been greatly amplified at the input of the demod. This rationale allows for the change. Second, source resistor R36 has to be bypassed with an electrolytic capacitor for the demod to have any audio gain. This is because the signal width at IF frequency is a relatively small percentage of the 9-MHz IF signal, and the phase differences are small. This allows for a virtual bypass capacitor in the mixer IF amps at the top of R6. However, the signal width of the composite audio signal is close to 100 percent at 3 kHz. There is no correlation in phase between the discrete signals making up the composite signal across R36. With no clear-cut 180-degree difference in phase at the top of R36, no virtual bypass capacitor can exist and a real bypass capacitor is needed here for audio gain.

With a bypassed source bias resistor, the BFO signal would also be amplified, but it is shunted to ground through C42 and C43 at the drains of the JFETS. The odd-order products fare better in the demod than in the mixer but have less effect here.

The audio transformer in my receiver is a 42TL021 from Mouser. I had no mounting holes drilled in the PC board, so I bent the mounting ears out at 90 degrees and soldered them to the top ground plane of the board. I also left as much room as possible for the transformer, so different transformers can be used. This transformer has a 4K-ohm primary and a secondary of 600 ohms. The DC resistance of the primary is less than 200 ohms. This is important, because the IR drop in the transformer can reduce the VDD available to the two JFETs. The drop also affects the 3-volt back-bias on the varactors and can cause serious problems. Any transformer that fits in the space and has these specs can be used. The secondary can be anywhere from 2K to 500 ohms. Change terminating resistor R37 if need be to match your secondary impedance.

The BFO

The BFO in this receiver is a circuit selected for its simplicity and low parts count. Transformer T9 must be a Mouser 42IF123 to give us an XL of over 300 ohms. The secondary is four turns of #36 wire scramble-wound at the top of the core. The top of the core is the cold end of the transformer, as I feed VCC in to the pin for the top winding to accommodate the board layout. Inductor L7 shifts the crystals' series resonance lower in frequency to mix with the upper-sideband signal. Tuning T9 will change frequency enough to move the BFO signal to the desired spot.

The BFO supplies 6 volts peak to peak into the 100-ohm load of the demodulator. The demod performance depends on a clean sine wave, so check for this on a scope if you can.

The Audio Filter

This audio filter circuit has been around for years and was in the *Handbook*. If you don't want the 3 dB gain of this circuit, change R41 and R45 to 1 meg 5% and you will get unity gain. I also changed R44 and R48 to 1.5 meg 1% to give me a frequency between 800 and 900 Hz, which I prefer.

The Audio Amp

The LM386 is considered a low-power chip, but I get plenty of volume from a

5 1/4-inch 4-ohm speaker and have never burned out a chip. I always use at least 10 ohms of decoupling in the VCC line and 220 µF or more of electrolytic bypass. I used both inputs here to give me a separate input for the sidetone generator. Resistor R62 can be changed to 100 ohms to give you more gain, but it should not be needed.

The Sidetone/Mute Circuit

This audio-phase-shift oscillator is from vacuum-tube days and will give you a clean, stable sine wave. The values needed for the beta phase-shift network can be found by using the formula 1/15.2 RC. I used 10% capacitors and 5% resistors, as I wanted a frequency somewhere between 800 and 900 Hz. A PNP transistor is used here so the CW keying line can be positive until key down. I included a key-click filter in the line to keep it quiet with my J38. The outputs are tapped down on the collector load resistor, as they require little amplitude and this helps with stability and startup.

The sidetone signal to the audio amp has a pot for adjustment, and the 800-Hz signal to the AGC circuit is seen as a very strong CW signal. There is enough signal to cut off the IF amps and quiet the receiver.

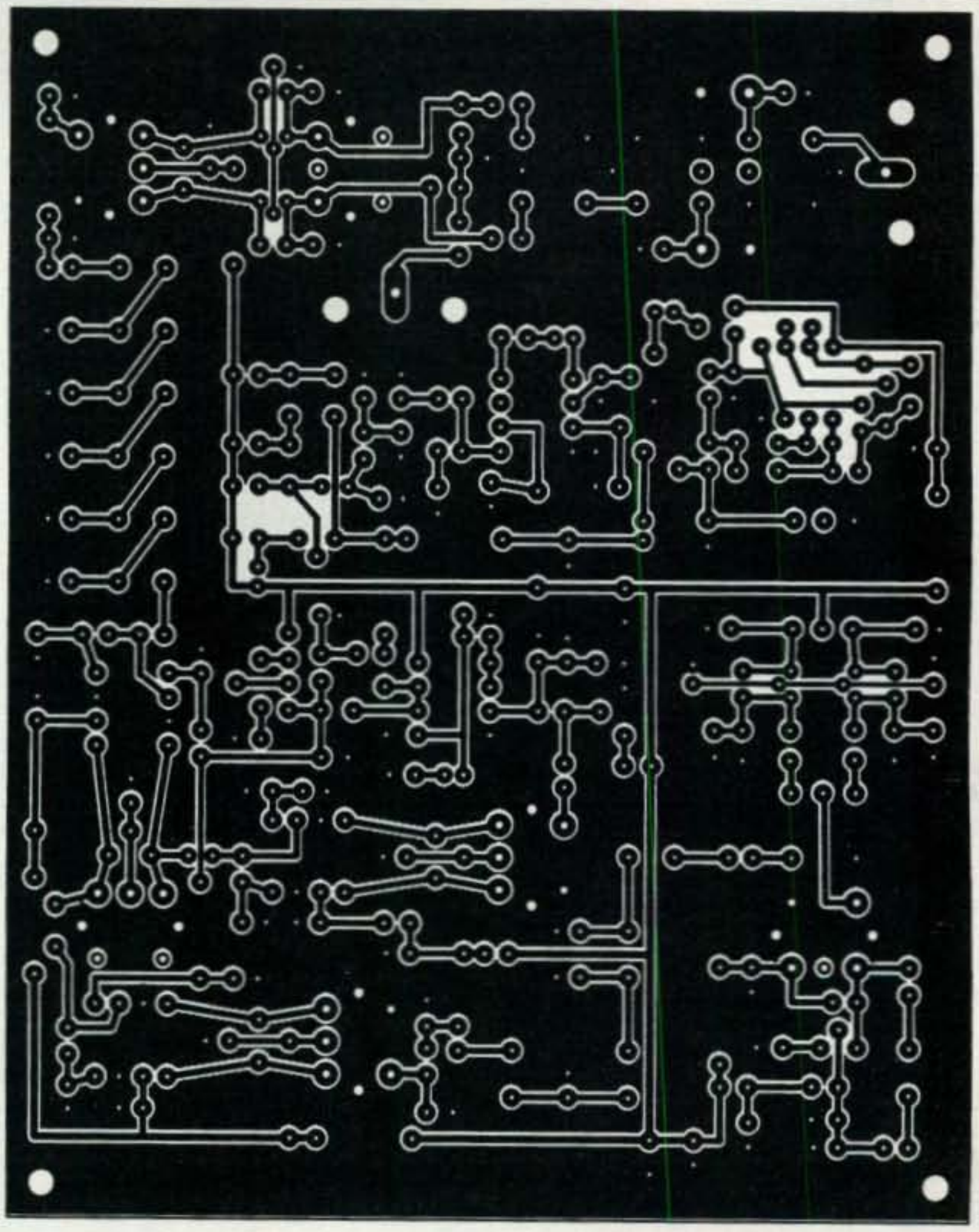

Fig. 6– Etching template for bottom of circuit board.

Circuit Notes

Most designs allow latitude in parts selection so the ham can use what is on hand or in his or her junkbox. This receiver is very parts specific, and you must use the parts specified, especially the varactors. The MAV2115 will not work in this mixer and demod circuit, as it has too little max capacitance. It might be useful in VHF or UHF mixers. You must use J309s, as the 3-volt back bias demands about 4.5 volts across R6 to bias the JFETs correctly. The J308 or J310 both have less gain and draw much more current. To get 4.5 volts across R6, these two will draw more than 10 milliamps apiece, which to me is excessive.

T1 and T2 use T37-6 cores. Don't use T-50s, as the BFO will get into the front end with their higher profile. I use BN-2402s for the baluns; FT37-43s would probably be okay. L1, L3, and all the other transformers except T9 are 42IF122s with their primaries removed. The six-turn secondary is #36 wire scramble-wound in the center of the secondary winding. T9 uses a 42IF123 for more XL, and the output winding is scramble-wound at the top of the secondary winding, as I made the top winding the cold end of the coil.

The audio transformer and the crystal filters have been covered and can be changed to suit you. If possible, use the LM386-3 or -D, as they are rated for higher VCC. The power supply must be well regulated or the LM386 will distort the audio. If you change the power supply from 12 volts to 13.8 volts, you have to retune L1, as the varactor capacitance will change.

Pre-etched circuit boards for this project are available from FAR Circuits for $15.00 each. For ordering information visit <http://www.farcircuits.net> on the web, or mail your order to FAR Circuits, 18N640 Field Ct., Dundee, IL 60118.

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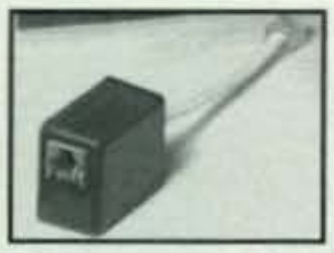

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Oops . . .

The map on page 18 of September *CQ* (in "Sleuthing the Neutral Zones . . . " by W4YO) was courtesy of Vic Crawford, W1TYQ, who provided it to the author. We apologize for the error.

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our readers say

Contesting and Nets

Editor, *CQ:*

I'm sure you're getting the usual e-mails about the (CQ WPX) contest vs. the emergency communications nets. There have to be a number of ways that we hams can work together for the protection of our bands. In case you haven't noticed lately, big business wants to take them away for profit. If they pull that off, we're all up that well-known creek without suitable means of propulsion.

Is it somehow possible that *CQ* could publish the "emergency service only" net frequencies as "not contest frequencies" in the interest of preserving our band allocation? Both contest participants (proving that we are a viable community that can pass information at will) and the emergency nets (rendering a service to those world citizens in need) contribute to the justification for our band allocations.

The one "fly in the ointment" is our feuding amongst ourselves on the air. That's a lousy endorsement for our continued use of the bands. Unfortunately, I heard some of that this past weekend. I'm not a referee so I'll not take sides. Simply let it be said that I monitored multiple exchanges on 14.300 where an operator for the Maritime Mobile Service Net was trying to assist a vessel in distress (no rudder, no propeller, and adrift in the Caribbean Sea) was told to get out of the way since he was interfering. The distress responder asked for a few moments to arrange a QSY for the vessel in distress and was (frankly) insulted on the air. Neither did much to enhance the protection of our bands.

I know the contest is international in nature. One of the few influences on contesters (since U.S. and international agencies seem to be doing nothing about the problem) is the good graces of *CQ* magazine. Can you possibly help? If we lose the band privileges, nobody wins. If we preserve the bands, we all win.

73 de KG4RQO

Dear OM: First of all, knowingly interfering with emergency communications is against the law in virtually every country. If you observed such interference, you should have noted the details and reported the offending station to the FCC (or if a DX station, to the proper authorities via the FCC). The CQ WPX Contest rules specifically say that participants should observe band plans and try to avoid interfering with nets or other ongoing communications. But we have no enforcement powers, nor the manpower to assign "frequency cops" to monitor the bands. If we were to designate certain specific frequencies as "off limits" to contesting, then everyone with an interest in any other frequency would come banging on our door demanding equal treatment. Plus, we'd still have no way of knowing whether a station was in compliance. If a station is cited by the FCC or another country's regulatory agency for interference or other rules violations in the course of competing in one of our contests, we will investigate and consider disqualifying that station. Beyond that, all we can do is encourage courtesy and cooperation from all.

Pseudo QSOs

Editor, *CQ:*

I have been an active ham radio operator for nearly 30 years. I have enjoyed working DX and have always been of the impression that, when doing so, the objective was to enjoy a contact with another country.

Until I read the letter in the August 2005 issue of *CQ* written by Mr. Howes, G4OWY, I had no idea that the nationality of the operator at the other end was a concern. Sadly, I have learned that many of my contacts, especially with DXpeditions and contest stations, are only "pseudo" QSOs.

What nonsense! Although I may be "denied the pleasure of working G4OWY," I hope to have the honor of working a YI station operated by one of the Americans over there defending the ways of life of the free world.

Wayne Greenough, VE3JSQ

On Reflection . . .

Editor, *CQ:*

Okay I remain suitably admonished! *("Our Readers Say," August CQ, p. 51.—ed.)* On reflection, maybe I was a touch over-zealous with my condemnation of American hams who use Iraqi callsigns whilst on "business" or whatever activity it might be in Iraq. But, I must confess that I still feel a shade uneasy even though it may appear to be better to hear Iraqi callsigns on the bands than not at all. Ditto Afganistan, at one point in time.

As to YI9AC/AB3AC's comments same issue and to reiterate his findings, there always have been lots of hams in Iraq—be they "licensed listeners" because of past government restrictions, or SWLs, etc. But I'm sure it would be more advantageous to entice many more Iraqi citizens to use the amateur airwaves and for American hams living there temporarily to try and resist the temptation to speak into the microphone or manipulate the key!

Ray J. Howes, G4OWY

Looking Ahead...

Here are some of the articles we're working on for upcoming issues of *CQ:*

- "This Club's Worth a Million," by Dan Moseson, KC2OOM
- "Beacon in a Box," by Jim Southwick, N1JS
- "A Closer Look at Deleted Countries," by Ed Richmond, W4YO

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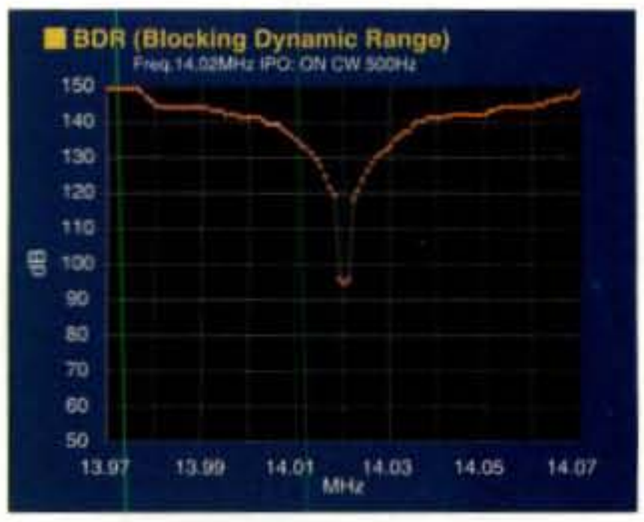
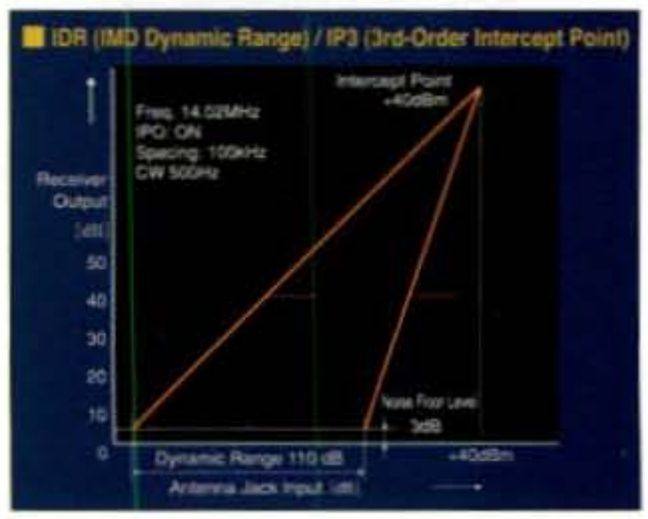


Moreover, care must be exercised when evaluating the claimed specifications of high-end receivers, as the precise measurement techniques associated with those specifications may be misleading. For example, a receiver with an outstanding Blocking Dynamic Range, measured with a test signal 100 kHz away, may, nonetheless, have inferior front-end characteristics when signals much closer than 10 kHz are encountered (as they typically are in a Contest or DX-pedition environment). Noise may be generated inside the receiver, to the extent that the desired signal is obscured by the noise or AGC action suppressing the sensitivity. Ultimately, the desired signal is lost.



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